US Army Corps
of Engineers
Kansas City District
Leaders in Customer Care

Plattsburgh Air Force Base Plattsburgh, New York

Specifications for

Landfill No. 023 Closure

Volume I of II

August 1992

MALCOLM PIRNIE

BID FORM FOR:

LANDFILL 023 – PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

ITEM	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	TOTAL PRICE
0001	**SITE PREPARATION AND CONSTRUCTION OF SUPPORT FACILITIES**				
	The following breakdown (sub-items) of the item 0001 is required; the sum of the individual sub-items constitutes the total price of item 0001.				
0001.1	All work required under item 0001 except items 0001.2 thru 0001.6 listed below.	N/A	Lump Sum	N/A	
0001.2	Mobilization/demobilization	N/A	Lump Sum	N/A	
0001.3	Dismantle and stockpile obstacle course structures	N/A	Lump Sum	N/A	
0001.4	Install obstacle course structures	N/A	Lump Sum	N/A	
0001.5	Remove and dispose of debris	N/A	Lump Sum	N/A	
0001.6	Clear and grub	N/A	Lump Sum	N/A	
	SUBTOTAL OF ITEM 0001				
0002	**CONSTRUCTION OF COVER SYSTEM SUBGRADE**				
	The following breakdown (sub-items) of the item 0002 is required; the sum of the individual sub-items constitutes the total price of item 0002.				
0002.1	All work required under item 0002 except items 0002.2 thru 0002.4, listed below.	N/A	Lump Sum	N/A	
0002.2	Furnish general backfill	55,000	Cubic Yards		
0002.3	Place and compact cover subgrade and preload material	N/A	Lump Sum	N/A	
0002.4	Regrade subgrade to final grades after preload settlement	N/A	Lump Sum	N/A	
	SUBTOTAL OF ITEM 0002				

BID FORM FOR:

LANDFILL 023 – PLATTSBURGH AIR FORCE BASE
PLATTSBURGH, NEW YORK

ITEM	DESCRIPTION	EST. QTY.	UNIT	UNIT PRICE	TOTAL PRICE
0003	**CONSTRUCTION OF COVER SYSTEM**				
	The following breakdown (sub-items) of the item 0003 is required; the sum of the individual sub-items constitutes the total price of item 0003.				
0003.1	All work required under item 0003 except items 0003.2 thru 0003.12 listed below.	N/A	Lump Sum	N/A	
0003.2	Furnish and install geotextile filter fabric	125,200	Square Yards		
0003.3	Furnish and install gas venting layer (12 inches thick)	57,300	Square Yards		
0003.4	Furnish and install gas vents	N/A	Lump Sum	N/A	
0003.5	Furnish and install PVC/PVC composite geomembrane	62,600	Square Yards		
0003.6	Furnish and install drainage layer (12 inches thick)	57,600	Square Yards		
0003.7	Furnish and install barrier protection layer (18 inches thick)	58,480	Square Yards		
0003.8	Furnish and install topsoil (6 inches thick)	77,200	Square Yards		
0003.9	Furnish and install geosynthetic erosion control blanket	4,800	Square Yards		
0003.10	Vegetate the site	122,200	Square Yards		
0003.11	Provide final certified topographic survey	N/A	Lump Sum	N/A	
0003.12	Install gas monitoring wells	N/A	Lump Sum	N/A	
	SUBTOTAL OF ITEM 0003				
0004	**DRAINAGE STRUCTURES**				
	The following breakdown (sub-items) of the item 0004 is required; the sum of the individual sub-items constitutes the total price of item 0004.				
0004.1	All work required under item 0004 except items 0004.2 thru 0004.4 listed below.	N/A	Lump Sum	N/A	
0004.2	Furnish and install drainage culvert	65	Linear Feet		
0004.3	Furnish and install perimeter drainage swales Type A - 195 Linear Feet Type B - 435 Linear Feet Type C - 680 Linear Feet Type D - 1,230 Linear Feet	2,540	Linear Feet		
0004.4	Furnish and install sedimentation basin	N/A	Lump Sum	N/A	
	SUBTOTAL OF ITEM 0004				
	TOTAL BID PRICE (THE SUM OF ITEMS 0001 THROUGH 0004)				

FRONT END DOCUMENTS FROM ACE TO BE INSERTED HERE

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SECTION 01010

SUMMARY OF WORK

1. LOCATION AND DESCRIPTION OF WORK

1.1 Location: The Work is located at the former domestic waste Landfill No. 023 located on Plattsburgh Air Force Base (PAFB), City of Plattsburgh, Clinton County, New York. The site, which is approximately 12 acres in area, is adjacent to an active Air Force runway and occupies a portion of property adjacent to Route 22.

1.2 Description: In general, the Work under this Contract for the domestic waste landfill closure consists of clearing the landfill of vegetation and debris, placing general backfill to the required grades and placing low permeability capping materials. Gas vents are to be installed to vent landfill decomposition gases. More specifically, the Work includes, but is not limited to, the following:

1.2.1 Construction of temporary support facilities necessary to complete the Work, including but not limited to: field personnel trailers and sanitary facilities.

1.2.2 Confirmation of limits of landfilled waste and updating site topographic map.

1.2.3 Clearing and grubbing existing vegetation within all areas of proposed Work and off-site disposal of chipped vegetation.

1.2.4 Dismantling and relocation of existing obstacles on the landfill.

1.2.5 Removal and off-site disposal (or recycling, if possible) of all debris within areas of proposed Work in accordance with all applicable regulations. Debris includes, but is not limited to, metal piping of various lengths and diameters, automobile tires, rusted barbed wire, an old oil tank (appoximately 1000 gallons) and sand bags. Manhole rims and covers currently on the landfill are PAFB property and will be removed by PAFB prior to commencement of Work.

1.2.6 Construction of stormwater drainage system, including perimeter swales, sedimentation basin and culvert.

1.2.7 Placement of contour grading material (i.e., cover subgrade and preload material), including grading and compaction, and temporary hydroseeding.

1.2.8 Regrading of contour grading material to final lines and limits.

1.2.9 Construction of landfill gas vents.

1.2.10 Construction of a low permeability cover over the landfill: Materials to be provided include, but are not limited to, the following:

1.2.10.1 Vegetative surface layer (topsoil).

1.2.10.2 Barrier protection layer (general backfill) .

1.2.10.3 Geotextile filter fabrics.

1.2.10.4 Drainage layer (select fill).

1.2.10.5 Polyvinyl Chloride (PVC)/PVC Composite geomembrane.

1.2.10.6 Gas venting layer (select fill).

1.2.11 Revegetation of covered landfill.

1.2.12 Construction of perimeter gas monitoring wells.

1.3 The summary of the Work described in Subsection 1.2 is an overall summary of the responsibilities of the Contractor. It does not supersede the specific requirements of the Contract Documents.

2. CONTRACTS

2.1 The Work shall be constructed under one prime contract.

3. WORK BY OTHERS

3.1 As necessary, the Contractor shall coordinate his work with the PAFB and other parties working on the Base as part of PAFB standard procedures.

4. CONTRACTOR'S USE OF PREMISES

4.1 Contractor's use of the premises shall be confined to the areas shown on the Contract Drawings, areas delineated by the PAFB, and to public rights-of-way.

4.2 In accordance with performing Work on PAFB, the Contractor shall:

4.2.1 Assume full responsibility for protection and safekeeping of products stored on or off premises.

4.2.2 Store products in such a way that they do not interfere with the operations of PAFB or other contractors working within PAFB.

4.2.3 Obtain and pay for all additional storage or work areas required for his operations.

4.2.4 Provide adequate security during all closure operations.

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SECTION 01015

SEQUENCE AND PROGRESS OF WORK

1. GENERAL:

1.1 Construction Schedules are addressed in SECTION 01310: CONSTRUCTION SCHEDULES. The Contractor shall incorporate within those schedules provisions to comply with the approved general sequence of Work.

1.2 Should alternative sequencing be desired to that suggested in this Section, the Contractor shall forward, for review and approval, his fully documented request which explains the benefits of his proposed sequencing with his Construction Schedules.

1.3 The Contractor shall resubmit the Construction Schedules to be in compliance with the specified sequencing if his documentation fails to satisfy the intent of specified sequencing as determined by the Contracting Officer.

2. CONTROLLING FACTORS FOR WORK SEQUENCING:

2.1 In order to meet the overall objectives of this project, certain elements of work must be substantially completed in sequence.

2.2 The mandatory or controlling factors are as follows:

2.2.1 Confirm limits of landfilled wastes at the site through test trenching along perimeter.

2.2.2 Clear site of obstacles vegetation and debris

2.2.3 Construct the temporary and permanent stormwater control system, including perimeter swales, piping, culvert, and sedimentation basin.

2.2.4 Preload the site to induce settlement by placing contour grading material (cover subgrade and preload material) as shown on Contract Drawings.

2.2.5 Install gas vents.

2.2.6 Place low permeability cover material.

3. SUGGESTED CONSTRUCTION SEQUENCE:

3.1 Confirm delineate limits of landfilled waste through test trenching program. Landfill limits shown on Contract Drawings are approximate.

3.2 Remove and dispose of (or recycle, if possible) off-site all debris within areas of proposed Work in accordance with all applicable regulations. The Contractor shall note that manhole rims and covers currently on the landfill are PAFB property and will be removed by PAFB prior to commencement of Work.

3.3 Dismantle and relocate existing obstacle course.

3.4 Construct stormwater drainage system, proceeding in the following sequence:

3.4.1 Construct culvert under southern perimeter roadway (Old Route 22) and outlet control.

3.4.2 Construct sedimentation basin and outlet control.

3.4.3 Construct perimeter swales.

3.5 Clear and grub existing vegetation within all areas of proposed Work and dispose of chipped vegetation off-site.

3.6 Place contour grading material for cover subgrade and preloading purposes as indicated on the Contract Drawings. Grade and compact material as required.

3.7 Hydroseed cover subgrade/preload material and stormwater drainage features with temporary seeding mixture.

3.8 Regrade contour grading material to final lines and limits.

3.9 Construct gas vents.

3.10 Construct low permeability cover over the landfill cover subgrade. Material placement shall proceed in the following sequence:

3.10.1 Geotextile filter fabric.

3.10.2 Gas venting layer.

3.10.3 Polyvinyl Chloride (PVC)/PVC composite geomembrane.

3.10.4 Drainage Layer.

3.10.5 Geotextile filter fabric.

3.10.6 Barrier protection layer.

3.10.7 Topsoil.

3.11 Hydroseed landfill and all stormwater drainage features with

final seeding mixture.

3.12 Install perimeter gas monitoring wells.

3.13 Restore all remaining areas of the site to their original condition.

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SECTION 01025

MEASUREMENT AND PAYMENT

1. DESCRIPTION:

1.1 The Items listed herein, beginning with Subsection 4, refer to and are the same pay Items listed in the Bid Form. They constitute all of the pay Items for the completion of the Work. No direct or separate payment will be made for providing miscellaneous, temporary or accessory works, materials testing, dust control, plant, services, layout surveys, job signs, testing, cleaning of roadways, safety devices, approval and record drawings, maintaining traffic, removal of waste, watchmen, bonds, insurance, and all other requirements of the Contract Clauses, Special Clauses, and the General Requirements. Compensation for all such services, items and materials shall be included in the prices stipulated for the lump sum and unit price pay Items listed herein.

1.2 Each lump sum and unit bid price will be deemed to include an amount considered by the Contractor to be adequate to cover Contractor's costs including overhead, profit, bond, etc. for each separately identified Item.

1.3 Bidders shall note that the measurements for payment, procedures and assumptions contained in this section supersede any and all other references which may appear elsewhere on the Contract Drawings or in the specifications.

1.4 Abbreviations and Definitions Used:

Install, Erect, Furnish and Provide - are synonymous and include all labor, materials, tools, equipment and all else required to accomplish the work shown or specified (i.e., "install silt curtain" requires the Contractor to provide all labor, materials including the silt curtain, tools, equipment and all else necessary to accomplish the installation of the silt curtain).

2. ENGINEER'S ESTIMATE OF QUANTITIES:

2.1 The estimated quantities for unit price pay Items, as listed in the Bid Form, are approximate only and are included solely for the purpose of comparison of Bids. The Contracting Officer does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of material encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as the Contracting Officer may deem necessary.

3. ADJUSTMENT OF UNIT PRICES FOR INCREASE OR DECREASE OF ESTIMATED QUANTITIES:

3.1 See CONTRACT CLAUSES.

4. BID ITEMS:

4.1 ITEM 0001 - SITE PREPARATION AND CONSTRUCTION OF SUPPORT FACILITIES.

4.1.1 Item 0001.1 - All Work Required Under Item 0001 Except Items 0001.2 Through Items 0001.6, Listed Below.

4.1.1.1 Measurement and Payment.

4.1.1.1.1 Payment for Item 0001.1 will be made at the lump sum price bid for Item 0001.1 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown or specified, except that which is included for payment under other Items of Work.

4.1.2 Item 0001.2 - Mobilization/Demobilization.

4.1.2.1 Measurement and Payment.

4.1.2.1.1 Payment for mobilization and demobilization of equipment will be made at the lump sum price bid for Item 0001.2 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to mobilize and demobilize Contractor owned and rented equipment. No separate payment will be made for preparing equipment for transit such as cleaning or decontaminating procedures, moving and securing equipment on to the transit vehicles and off loading equipment. Payment for this work will be included in the lump sum price for Item 0001.2.

4.1.3 Item 0001.3 - Dismantle and Stockpile Obstacle Course Structures.

4.1.3.1 Measurement and Payment

4.1.3.1.1 Payment for Item 0001.3 will be made at the lump sum price bid for Item 0001.3 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown and specified, including but not limited to dismantling, transporting and stockpiling of existing obstacle structures, except that which is included for payment under other Items of work.

4.1.4 Item 0001.4 - Install Obstacle Course Structures.

4.1.4.1 Measurement and Payment

4.1.4.1.1 Payment for Item 0001.4 will be made at the lump sum price bid for Item 0001.4 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown and specified, including but not limited to transporting and installing existing obstacle structures, except that which is included for payment under other Items of work.

4.1.5 Item 0001.5 - Remove and Dispose of Debris

4.1.5.1 Measurement and Payment.

4.1.5.1.1 Payment for Item 0001.5 will be made at the lump sum price bid for Item 0001.5 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown or specified, except that which is included for payment under other Items of work. Work shall include removal and disposal, in accordance with all applicable rules and regulations, of the existing site debris, including but not limited to: various lengths of metal piping, abandoned tank, automobile tires, and other such debris. This item shall also include removal of any debris generated by the Contractor during the Work, which shall include, but not be limited to, damaged, scrap or rejected construction materials. Work shall include, but not be limited to, loading, transporting and disposal of all materials. No separate payment will be made for tipping fees, sampling and analysis if required by the disposal facility. Payment for this work will be included in tne lump sum price bid for Item 0001.5. No separate payment will be made for removal and disposal of manhole rims and covers, which are PAFB property and will be removed by PAFB.

4.1.6 Item 0001.6 - Clear and Grub.

4.1.6.1 Measurement and Payment.

4.1.6.1.1 Payment for Item 0001.6 will be made at the lump sum price bid for Item 0001.6 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to clear and grub to the limits of clearing as shown on the Contract Drawings and as specified, including survey work, loading, transporting and disposal of all materials. No separate payment will be made for tipping fees, sampling and analysis if required by the disposal facility. Payment for this work will be included in the lump sum price bid for Item 0001.6.

4.2 ITEM 0002 - CONSTRUCTION OF COVER SYSTEM SUBGRADE.

4.2.1 Item 0002.1 - All Work Required Under Item 0002 Except Items 0002.2 Through Items 0002.4, Listed Below.

4.2.1.1 Measurement and Payment.

4.2.1.1.1 Payment for Item 0002.1 will be made at the lump sum price bid for Item 0002.1 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown or specified, except that which is included for payment under other Items of Work.

4.2.2 Item 0002.2 - Furnish General Backfill.

4.2.2.1 Measurement.

4.2.2.1.1 The quantity to be paid for under Item 0002.2 will be the number of cubic yards of material delivered to the site. Material will be measured in-place through a ground survey of the borrow pit, between the cross-section of the initial grade and the final grade of the borrow pit.

4.2.2.2 Payment.

4.2.2.2.1 Payment for furnishing general fill will be made at the unit price bid for Item 0002.2 and will constitute full compensation for furnishing all labor, materials, tools, equipment and testing necessary to furnish certified clean general backfill as shown and specified. No separate payment will be made for survey work. Payment for this work will be included in the price bid for Item 0002.2.

4.2.3 Item 0002.3 - Place and Compact Cover Subgrade and Preload Material.

4.2.3.1 Measurement and Payment.

4.2.3.2.1 Payment for placing and compacting the cover subgrade and preload material will be made at the lump sum price bid for Item 0002.3 and will constitute full compensation for furnishing all labor, materials, settling plates, tools, equipment and testing necessary to place and compact the cover subgrade and preload material to the lines and grades shown on the Contract Drawings or limits of waste as determined by test trenching. No separate payment will be made for survey work, compaction testing and other work required for cover subgrade and preloading. Payment for this work will be included in the price bid for Item 0002.3.

4.2.4 Item 0002.4 - Regrade Subgrade to Final Grades After Preload Settlement.

4.2.4.1 Measurement and Payment.

4.2.4.2.1 Payment for regrading of the cover system subgrade to final grades after preload settlement will be made at the lump sum price bid for Item 0002.4 and will constitute full compensation for furnishing all labor, materials, tools, equipment necessary to regrade the cover system subgrade to the lines and grades shown on the Contract Drawings. No separate payment will be made for survey work and for removing and disposing of material which is placed beyond the lines and grades shown on the Contract Drawings or limits of waste as determined by test trenching as performed under this Item or as performed under Item 0002.3. Payment for this work will be included in the price bid for Item 0002.4.

4.3 ITEM 0003 - CONSTRUCTION OF COVER SYSTEM.

4.3.1 Item 0003.1 - All Work Required Under Item 0003 Except Items 0003.2 through Items 0003.12, Listed Below.

4.3.1.1 Measurement and Payment.

4.3.1.1.1 Payment for Item 0003.1 will be made at the lump sum price bid for Item 0003.1 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown or specified, except that which is included for payment under other Items of Work.

4.3.2 Item 0003.2 - Furnish and Install Geotextile Filter Fabric.

4.3.2.1 Measurement.

4.3.2.1.1 The quantity to be paid for under Item 0003.2 will be the number of square yards of area covered by the two layers of geotextile filter fabric as measured through a ground survey. Geotextile filter fabric placed outside of the limits shown on the Contract Drawings or limits of waste as determined by test trenching will not be measured for payment. The Contractor is required under this item to regrade rutted areas, remove stones, tree limbs and any other objects which may damage the geotextile filter fabric.

4.3.2.2 Payment.

4.3.2.2.1 Payment for placement of geotextile will be made at the unit price bid for Item 0003.2 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the geotextile filter fabric. No separate payment will be

made for transporting and disposal of potentially damaging objects removed from the subgrade. Payment for this work will be included in the unit price bid under Item 0003.2.

4.3.3 Item 0003.3 - Furnish and Install Gas Venting Layer (12 inches thick).

4.3.3.1 Measurement.

4.3.3.1.1 The quantity to be paid for under Item 0003.3 will be the number of square yards of gas venting layer sand, 12 inches thick, placed and compacted as measured in place through a ground survey, as shown on the Contract Drawings. Material placed beyond the final gas venting layer lines and grades will not be measured for payment.

4.3.3.2 Payment.

4.3.3.2.1 Payment for placing the gas venting layer will be made at the unit price bid for Item 0003.3 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the gas venting layer as shown and as specified. No separate payment will be made for survey work and for removing and disposing of material which is placed beyond the lines and grades shown on the Contract Drawings or limits of waste as determined by test trenching. Payment for this work will be included in the unit price bid under Item 0003.3.

4.3.4 Item 0003.4 - Furnish and Install Gas Vents.

4.3.4.1 Measurement and Payment.

4.3.4.1.1 Payment for constructing gas vents will be made at the lump sum price bid for Item 0003.4 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish, assemble and install the gas vents as shown and specified. No separate payment will be made for survey work. Payment for this work will be included in the unit price bid under Item 0003.4.

4.3.5 Item 0003.5 - Furnish and Install PVC /PVC Composite Geomembrane.

4.3.5.1 Measurement.

4.3.5.1.1 The quantity to be paid for under Item 0003.5 will be the number of square yards, as measured through a ground survey, of area covered by PVC Geomembrane/PVC Composite Geomembrane installed as shown and as specified. Material placed beyond the PVC Geomembrane/PVC Composite Geomembrane limits as delineated in the Contract Drawings or limits of waste as determined by test trenching will not be measured for

payment.

4.3.5.2 Payment.

4.3.5.2.1 Payment for installing PVC geomembrane/PVC Composite Geomembrane will be made at the unit price bid for Item 0003.5 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the PVC geomembrane/PVC Composite Geomembrane including sealing seams, gas vent sleeves, protecting the geomembrane from rain, snow, sleet, wind and sun damage, and securing the ends of the geomembrane.

4.3.6 Item 0003.6 - Furnish and Install Drainage Layer (12 Inches Thick).

4.3.6.1 Measurement.

4.3.6.1.1 The quantity to be paid for under Item 0003.6 will be the number of square yards of drainage layer sand, 12 inches thick, placed and compacted as measured in place through a ground survey, as shown on the Contract Drawings. Material placed beyond the final drainage layer lines and grades will not be measured for payment.

4.3.6.2 Payment.

4.3.6.2.1 Payment for placing the drainage layer will be made at the unit price bid for Item 0003.6 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the drainage layer. No separate payment will be made for survey work and for removing and disposing of material which is placed beyond the lines and grades shown on the Contract Drawings or limits of waste as determined by test trenching. Payment for this work will be included in the unit price bid under Item 0003.6.

4.3.7 Item 0003.7 - Furnish and Install Barrier Protection Layer (18 Inches Thick).

4.3.7.1 Measurement.

4.3.7.1.1 The quantity to be paid for under Item 0003.7 will be the number of square yards of barrier protection material, 18 inches thick, placed and compacted as measured in place through a ground survey, as shown on the Contract Drawings or limits of waste as determined by test trenching. Material placed beyond the final barrier protection layer lines and grades will not be measured for payment.

4.3.7.2 Payment.

4.3.7.2.1 Payment for placing the barrier protection layer will be made at the unit price bid for Item 0003.7 and will constitute full compensation for all labor, materials, tools and equipment necessary to furnish and install the barrier protection layer as shown and specified. No separate payment will be made for survey work and for removing and disposing of material which is placed beyond the lines and grades shown on the Contract Drawings. Payment for this work will be included in the unit price bid under Item 0003.7.

4.3.8 Item 0003.8 - Furnish and Install Topsoil (6 Inches Thick).

4.3.8.1 Measurement.

4.3.8.1.1 The quantity to be paid for under Item 0003.8 will be the number of square yards of topsoil, 6 inches thick, placed and graded as measured in place through a ground survey, as shown on the Contract Drawings. Material placed beyond the final topsoil lines and grades will not be measured for payment.

4.3.8.2 Payment.

4.3.8.2.1 Payment for placing the topsoil will be made at the unit price bid for Item 0003.8 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the topsoil as shown and specified. No separate payment will be made for survey work and for removing and disposing of material which is placed beyond the lines and grades shown on the Contract Drawings. Payment for this work will be included in the unit price bid under Item 0003.8.

4.3.9 Item 0003.9 - Furnish and Install Geosynthetic Erosion Control Blanket

4.3.9.1 Measurement.

4.3.9.1.1 The quantity to be paid for under Item 0003.9 will be the area in square yards covered by the geosynthetic as measured through a ground survey. Geosynthetic placed outside of the limits shown on the Contract Drawings or limits of waste as determined by test trenching will not be measured for payment. The Contractor is required under this item to regrade rutted areas, remove stones, tree limbs and any other objects which may damage the geosynthetic erosion control blanket.

4.3.9.2 Payment.

4.3.9.2.1 Payment for placement of geosynthetic erosion control blanket will be made at the unit price bid for Item 0003.9 and will constitute full compensation for furnishing all labor, materials, tools and equipment

necessary to furnish and install the geosynthetic erosion control blanket. No separate payment will be made for transporting and disposal of potentially damaging objects removed from the subgrade. Payment for this work will be included in the unit price bid under Item 0003.9.

4.3.10 Item 0003.10 - Vegetate the Site.

4.3.10.1 Measurement.

4.3.10.1.1 The quantity to be paid for under Item 0003.10 will be the area, in square yards as measured through a ground survey, hydroseeded using materials placed as shown and specified.

4.3.10.2 Payment.

4.3.10.2.1 Payment for hydroseeding will be made at the unit price bid for Item 0003.10 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish and install the vegetation as shown and specified including monitoring and maintenance.

4.3.11 Item 0003.11 - Provide Final Certified Topographic Survey.

4.3.11.1 Measurement and Payment.

4.3.11.1.1 Payment for providing final topographic survey (two-foot contour interval) certified by a New York State Licensed Surveyor will be made at the lump sum price bid for Item 0003.11 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to provide a final certified topographic survey as specified.

4.3.12 Item 0003.12 - Furnish and Install Gas Monitoring Wells

4.3.12.1 Measurement and Payment.

4.3.12.1.1 Payment for constructing gas monitoring wells will be made at the lump sum price bid for Item 0003.12 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to furnish, assemble and install the gas monitoring wells as shown and specified. No separate payment will be made for survey work. Payment for this work will be included in the unit price bid under Item 0003.12.

4.4 ITEM 0004 - DRAINAGE STRUCTURES.

4.4.1 Item 0004.1 - All Work Required Under Item 0004 Except Items 0004.2 Through Items 0004.4, Listed Below.

4.4.1.1 Measurement and Payment.

4.4.1.1.1 Payment for Item 0004.1 will be made at the lump sum price bid for Item 0004.1 and will constitute full compensation for furnishing all labor, materials, tools and equipment required to complete the work as shown or specified, except that which is included for payment under other Items of Work.

4.4.2 Item 0004.2 -Furnish and Install Drainage Culvert.

4.4.2.1 Measurement.

4.4.2.1.1 The quantity to be paid for under Item 0004.2 will be the length in linear feet of culvert furnished and installed as shown on the contract drawings and as specified, measured at the invert.

4.4.2.2 Payment.

4.4.2.2.1 Payment for constructing the culvert will be made at the unit price bid for Item 0004.2 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to construct the culvert, including; excavation, pipe bedding material, collars, end sections, rip rap and all else necessary to furnish and install the culvert as shown and specified. No separate payment will be made for saw cutting pavement, traffic control and roadway restoration, including pipe backfill, sub-base and base stone, asphalt or concrete pavement and for remobilization and installation of the upstream mitered end section after removal of the temporary sediment basin outlet. Payment for this work will be included in the unit price bid for item 0004.2.

4.4.3 Item 0004.3 - Furnish and Install Perimeter Drainage Swales.

4.4.3.1 Measurement.

4.4.3.1.1 The quantity to be paid for under Item 0004.3 will be the number of linear feet of each type of swale excavated as measured in place at the swale invert through a ground survey.

4.4.3.2 Payment.

4.4.3.2.1 Payment for constructing the perimeter drainage swales will be made at the unit price bid for each type of drainage swale shown in Item 0004.3 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to construct the swales including excavation, geotextiles and temporary erosion control features including but not limited to silt curtains, haybales, fasteners, geosynthetics, rip rap and all else necessary to install the perimeter drainage swales. Fill will be included in item 0002.2. No separate

payment will be made for survey work. Payment for this work will be included in the unit price bid for Item 0004.3.

4.4.4 Item 0004.4 - Furnish and Install Sedimentation Basin.

4.4.4.1 Measurement and Payment.

4.4.4.1.1 Payment for furnishing and installing the sedimentation basin and temporary sedimentation basin outlet structures and for removal of the temporary outlet structures will be made at the lump sum price bid for Item 0004.4 and will constitute full compensation for furnishing all labor, materials, tools and equipment necessary to install the sedimentation basin, remove and dispose of accumulated silt and debris and install, remove and dispose of the temporary outlet structures.

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SECTION 01030

SPECIAL CONSTRUCTION CONDITIONS

1. GENERAL

1.1 The Work is to be conducted on a former domestic solid waste and construction debris landfill. Methane gas has been detected within the landfill and near its surface.

1.2 The Work involves filling and grading to the final slopes of the landfill. This requires working on steep slopes and all precautions shall be taken to minimize the chance of a mishap, or cause a slope failure.

1.3 The Work includes excavating into waste for installation of gas vents and other ancillary work incidental to capping the landfill.

1.4 The Contractor shall:

1.4.1 Prepare a site specific health and safety plan as specified in SECTION 01460: HEALTH AND SAFETY PROCEDURES and submit it to the PAFB for review, prior to the start of the Work. Plan submission is for PAFB use only and will not be approved by PAFB. The plan shall be designed to protect PAFB personnel and visitors of the Base, from any potential health hazard due to the construction operations. Contractor shall note that OSHA regulations, SECTION 29 CFR 1910.120 are applicable to this Project.

1.4.2 Perform work so as not to interfere with other Contractors working on site or with PAFB's daily operations.

1.4.3 Allow other parties that are permitted site access to conduct site visits and meet with the Contractor, including representatives of State and Federal regulatory agencies.

1.4.4 Provide for continuous monitoring of ambient air temperatures and precipitation on-site at the PAFB LF-023 site during the Work. Contractor shall maintain a daily log of ambient air temperatures and precipitation which at a minimum shall note:

1.4.4.1 Daily minimum and maximum temperatures.
1.4.4.2 Daily precipitation to the nearest 0.1 inch.

1.4.5 Since the subgrade for the final landfill cover is expected to settle during construction, the Contractor shall take appropriate measures to maintain finished grades shown on the Contract Drawings and to specifications.

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SECTION 01040

COORDINATION

1. GENERAL

1.1 As more fully set forth in SECTION 01030: SPECIAL CONSTRUCTION CONDITIONS, Contractor shall be solely responsible for coordination of all the Work. He shall supervise, direct and cooperate fully with all Subcontractors, manufacturers, fabricators, suppliers, distributors, installers, testing agencies and all others whose services, materials or equipment are required to ensure completion of the Work within the Contract Time.

1.2 Contractor shall cooperate with and coordinate his Work with the work of any other contractor, utility service company or PAFB personnel performing additional work related to the Project at the site.

1.3 Contractor shall also coordinate his Work with the work of others to assure compliance with schedules.

1.4 Contractor shall attend and participate in all project coordination or progress meetings and report on the progress of all Work and compliance with schedules.

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SECTION 01050

FIELD ENGINEERING

1. GENERAL:

1.1 The Contractor shall provide professional survey services for the entire length of this project.

1.1.1 Survey monuments have been installed at the site and are shown on the Contract Drawings. The Contractor shall use these monuments to conduct all surveys required for the work.

1.2 Contractor shall:

1.2.1 Provide civil, structural or other professional engineering services specified or required to execute Contractor's construction methods.

1.2.2 Develop and make all detail surveys and measurements needed for construction including slope stakes, and all other working lines, elevations and cut sheets.

1.2.3 Keep a transit and leveling instrument on the site at all times and a skilled instrument man employed or obtained whenever necessary for layout of the Work.

1.2.4 Provide all material required for additional bench marks, additional control points, grade stakes, and other items.

1.2.5 Be solely responsible for all locations, dimensions and levels. No data other than written orders of the Contracting Officer shall justify departure from the dimensions and levels required by the Contract Drawings.

1.2.6 Safeguard all points, stakes, grade marks, monuments and bench marks made or established on the Work, re-establish same if disturbed and rectify all Work improperly performed because of not maintaining, not protecting or removing without authorization such established points, stakes, marks and monuments.

1.2.6.1 The Contractor shall maintain the survey monuments shown on the Contract Drawings for the duration of the project at no additional cost to the government.

1.2.6.2 The Contractor shall notify the Contracting Officer if any survey monuments need to be moved or will be destroyed by the Contractor's work. Before moving/destroying any monuments, the Contractor must submit a plan for reestablishing the monuments to the Contracting Officer for approval.

1.2.7 When requested by Contracting Officer, provide such facilities, as defined in Paragraph 2.2.2, as may be necessary for Contracting Officer to check line and grade points placed by Contractor. Contractor shall do no excavation or embankment work until all cross-sectioning necessary for determining pay quantities has been completed and checked by the Contracting Officer.

1.3 Contractor shall submit a plan for the control of grading to the Contracting Officer for Contracting Officer's approval. In this plan, Contractor shall address the protection of geosynthetics and geomembranes and the possible settlement of the landfill during the Work. The plan shall also address the measurement of soil materials placed by the Contractor and the possible settlement of the landfill during the Work.

2. CONTRACTOR'S FIELD ENGINEER:

2.1 Contractor shall employ and retain at the site of the Work a field engineer capable of performing all engineering tasks required of the Contractor.

2.2 Tasks included are:

2.2.1 Daily reports of Project activity to be submitted to the Contracting Officer with all pertinent information pertaining to the Project as follows:

2.2.1.1 Number of employees,
2.2.1.2 Subcontractor employees,
2.2.1.3 Breakdown of employees by trade,
2.2.1.4 Major equipment and materials installed,
2.2.1.5 Major construction equipment utilized,
2.2.1.6 Location of all areas in which construction was done,
2.2.1.7 Materials and equipment received.
2.2.1.8 Quality control reports.
2.2.1.9 Results and location of laboratory and Field tests of materials as specified in the Contract Drawings.

2.2.2 Provide all surveying equipment required including transit, level, stakes and required surveying accessories.

2.2.3 Furnish all required lines and grades for construction operations.

2.2.4 Maintain field office files and drawings, record drawings, and coordinate engineering services with subcontractors. Prepare layout and coordination drawings for construction operations.

2.2.5 Check and coordinate Work for conflicts and interferences and immediately advise Contracting Officer of all discrepancies noted.

2.2.6 Cooperate with Contracting Officer in field inspections as required.

3. QUALIFICATIONS OF SURVEYOR AND ENGINEER:

3.1 Contractor's land surveyors shall be a registered land surveyor, licensed in the State of New York, acceptable to the Contracting Officer.

3.2 Contractor's field engineer shall be a registered professional civil engineer, licensed in the State of New York, acceptable to the Contracting Officer.

4. RECORDS:

4.1 Maintain a complete, accurate log of all control and survey work as it progresses.

4.2 On completion of excavations and major site improvements (i.e. drainage structures, contour grading material placement and geomembranes, prepare a certified survey showing all dimensions, locations, angles and elevations of construction. Survey in an AUTOCAD File compatible with the Contracting Officer's AUTOCAD software, and a reproducible mylar at a scale of 1" = 50' with a contour interval of two feet to both be submitted to the Contracting Officer.

5. SUBMITTALS:

5.1 Submit name, address and qualifications of surveyor and engineer to the Contracting Officer.

5.2 Submit documentation to verify accuracy of field engineering work.

5.3 Submit a certificate signed by registered engineer or surveyor certifying that elevations and locations of Work are in conformance with Contract Documents. Explain all deviations.

6. SURVEY DATA:

6.1 Survey data shall conform to the requirements of the Special Conditions or as described in this SECTION.

6.2 Contractor shall keep neat legible notes of all measurements and calculations made by him while surveying and laying out the work.

6.3 One copy of all notes shall be furnished to the Contracting Officer as the Work progresses and a second complete copy furnished to the Contracting Officer with other record documents upon final completion of the Project.

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SECTION 01091

REFERENCE STANDARDS

1. USE OF REFERENCED STANDARDS: When a reference standard is specified, comply with requirements and recommendations stated in that standard, except when they are modified by the Contract Documents, or when applicable laws, ordinances, rules, regulations or codes establish stricter standards. The latest provisions of applicable standards shall apply to the Work, unless otherwise specified.

2. LIST OF REFERENCES: Reference standards include, but are not necessarily limited to, the following:

2.1 American Association of State Highway and Transportation Officials.

2.2 American Concrete Institute.

2.3 American Institute of Steel Construction.

2.4 American Iron and Steel Institute.

2.5 American National Standards Institute.

2.6 American Society of Heating, Refrigerating and Air Conditioning Engineers.

2.7 American Society of Mechanical Engineers.

2.8 American Society for Testing and Materials.

2.9 American Water Works Association.

2.10 American Welding Society.

2.11 Chain Link Fence Manufacturer's Institute.

2.12 Concrete Reinforcing Steel Institute.

2.13 Factory Mutual Association.

2.14 Federal Specifications

2.15 Institute of Electrical and Electronics Engineers.

2.16 National Electrical Manufacturer's Association.

2.17 National Fire Protection Association.

2.18 New York State Department of Transportation, Standard Specifications - Construction and Materials

2.19 Prestressed Concrete Institute.

2.20 Underwriters' Laboratories, Inc.

2.21 All other applicable standards listed in the Specifications, and the standards of utility service companies, where applicable.

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SECTION 01092

ABBREVIATIONS AND SYMBOLS

1. ABBREVIATIONS: Common abbreviations which may be found in the Specifications are:

alternating current	a-c	gallon	gal
ante meridiem	a.m.	gallons per minute	gpm
ampere	A	gallons per second	gps
average	avg	gram	g
biochemical oxygen demand	BOD	Hertz	HZ
brake horsepower	bhp	hour	hr
British thermal unit	Btu	horsepower	hp
Centigrade	C	inch	in.
Contracting Officer	CO	inch-pound	in.-lb
cubic inch	cu in	inside diameter	ID
cubic foot	cu ft	kilovolt-ampere	kva
cubic yard	cu yd	kilowatt	kw
cubic feet per minute	cfm	kilowatt-hour	kwh
cubic feet per second	cfs	linear foot	lin ft
decibel	db	liter	l
degree Centigrade (or Celsius) (say)	20°C	maximum	max
degree Fahrenheit (say)	68°F	mercury	Hg
diameter	diam	milliequivalents	meq's
direct current	d-c	milligram	mg
dollars	$	milligrams per kilogram	mg/kg
each	ea	milligrams per liter	mg/l
efficiency	eff	milliliter	ml
		millimeter	mm
Fahrenheit	F	million gallon	mil
feet	ft	million gallons per day	mgd
feet per hour	fph	minimum	min
feet per minute	fpm	net positive suction head	npsh
feet per second	fps	number	No.
figure	Fig.	National Pipe Threads	NPT
flange	flg	ounce	oz
foot-pound	ft-lb	outside diameter	OD

parts per million	ppm	second	sec
plus or minus	(±)	specific gravity	sp gr
post meridiem	p.m.	square	sq
pound	lb	square foot	sq ft
pounds per square foot	psf	square inch	sq in
pounds per square inch	psi	square yard	sq yd
pounds per square inch absolute	psia	standard	std
pounds per square inch gage	psig	standard cubic feet per minute	scfm
revolutions per minute	rpm	total dynamic head	TDH
		volt	V

2. ORGANIZATION ABBREVIATIONS: Abbreviations of organizations which may be used in these Specifications are:

AASHTO	American Association of State Highway and Transporation Officials
ACS	American Chemical Society
ACI	American Concrete Institute
AGMA	American Gear Manufacturers Association
AIChE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APHA	American Public Health Association
AREA	American Railway Engineering Association
ASTM	American Society for Testing and Materials
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
AWWA	American Water Works Association
AWS	American Welding Society
COE	Corps of Engineers
CRSI	Concrete Reinforcing Steel Institute
DIPRA	Ductile Iron Pipe Research Association
EPA	Environmental Protection Agency
FM	Factory Mutual
HEW	Department of Health, Education and Welfare
HUD	Department of Housing and Urban Development
IEEE	Institute of Electrical and Electronic Engineers
IRI	Industrial Risk Insurance
ISO	Insurance Services Office
MSSVFI	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NSF	National Sanitation Foundation

NYSDOTSS	New York State Department of Transportation Standard Specifications
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
PCI	Precast Concrete Institute
PAFB	Plattsburgh Air Force Base
SMACNA	Sheet Metal and Air Conditioning National Association
SSPC	Steel Structures Painting Council
UL	Underwriters Laboratories, Inc.
USGS	United States Geological Survey
USPHS	United States Public Health Service
WWEMA	Water and Wastewater Equipment Manufacturers Association
WPCF	Water Pollution Control Federation

3. LEGEND: Legends of symbols used are shown on the Contract Drawings, and in general, use of symbols is confined to the Contract Drawings.

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SECTION 01201

PRE-CONSTRUCTION AND PRE-WORK CONFERENCE

1. PRE-CONSTRUCTION CONFERENCE:

1.1 Within 7 days after issuance of the Notice to Proceed, the Contractor shall meet with the Contracting Officer for a Pre-Construction Conference. The purpose of this conference is to review safety, submittal procedures, "community relations", payrolls, labor relations, environmental protection, progress schedules, network analysis software system, payment, procurement of materials and quality control plan. The principal features of work will also be reviewed and any questions regarding the contract and work site will be addressed. Attendance by the Contractor's superintendent, the Safety Officer and other key personnel will be required.

2. PRE-WORK CONFERENCE:

2.1 As soon after the Notice to Proceed as practicable and prior to starting on-site mobilization, a Pre-Work Conference will be held between the Contractor and Contracting Officer or his representative. Attendance by the Contractor's superintendent, quality control personnel, safety personnel, and any major subcontractor's superintendents will be required.

2.2 At least three weeks prior to this Conference, the Contractor shall submit to the Contracting Officer fifteen (15) copies of the following:

2.2.1 Progress Chart and Preliminary Network Analysis
2.2.2 Health and Safety Plan
2.2.3 Quality Control Plan
2.2.4 Environmental Protection Plan

2.3 These will be reviewed at the Pre-Work Conference to provide the Contracting Officer with a general understanding of the salient points prior to initiating the approval process.

2.4 Questions concerning the administrative requirements outlined during the Pre-Construction Conference or any other aspect of the project may also be addressed.

3. ADMINISTRATION:

3.1 The conferences will be held at the New York District Corps of Engineer's offices.

3.2 The Contractor shall take notes of each conference and, within three days, distribute to all participants a summary of all pertinent matters arising from the two conferences.

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SECTION 01202

PROGRESS MEETINGS

1. GENERAL

1.1 Date and Time:

1.1.1 Regular Bi-Monthly Meetings: There shall be at least two meetings per month, as mutually agreed upon by Contracting Officer and Contractor.

1.1.2 Other Meetings: A special meeting will be held when and if a major QA/QC problem or deficiency is present or likely to occur. At a minimum, the meeting shall be attended by the construction personnel, QA inspection personnel and QA/QC Contracting Officer. NYSDEC personnel will also be informed of the meeting time and place. The purpose of these meetings will be to define and resolve the QA/QC problem(s) encountered or recurring QA/QC deficiencies in the following manner:

1.1.2.1 Define and discuss the problem or deficiencies;

1.1.2.2 Review alternative solutions;

1.1.2.3 Implement a plan to resolve the problem or deficiency.

1.1.3 Place: Contracting Officer's office at Project site or other mutually agreed upon location.

1.1.4 Contracting Officer shall prepare agenda, preside at meetings, and prepare and distribute a transcript of proceedings to all parties.

1.1.5 Contractor shall provide data required and be prepared to discuss all items on agenda.

2. MINIMUM ATTENDANCE

2.1 Contractor, Subcontractors and suppliers. Representatives present for each party shall be authorized to act on their behalf.

2.2 Contracting Officer

2.3 PAFB's representative.

2.4 NYSDEC representative.

2.5 Others as appropriate.

3. AGENDA

3.1 Agenda will include, but will not necessarily be limited to, the following:

3.1.1 Transcript of previous meeting.

3.1.2 Progress since last meeting.

3.1.3 Planned Work progress for next period.

3.1.4 Address/resolve any existing or anticipated problems, conflicts and observations.

3.1.5 Discuss/resolve any coordination or QA problems encountered to date.

3.1.6 Change Orders.

3.1.7 Applications for progress payment.

3.1.8 Quality standards and control.

3.1.9 Schedules, including off-site fabrication and delivery schedules. Corrective measures required.

3.1.10 Coordination between parties.

3.1.11 Other business.

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SECTION 01300

SUBMITTALS

1. GENERAL:

1.1 Scope of Work: The Contractor shall provide the submittals identified in each specification section for approval by the Contracting Officer.

1.2 Other Submittals:

1.2.1 All Contractors shall submit certain documents as part of their bids. These submittals are listed in the "Bid Schedule".

1.2.2 The successful Contractor shall submit certain documents to the Contracting Officer prior to the start of work. These documents are listed on ENG Form 4288, a blank copy of which is attached to this SECTION.

2. SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:

2.1 Shop Drawings:

2.2 Shop drawings, as defined in the Contract Clauses, and as specified in individual work sections include, but are not necessarily limited to, fabrication and erection/installation drawings, scheduled information, setting diagrams, actual shopwork manufacturing instruction, and coordination drawings, as applicable to the work.

2.3 All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

2.4 Product Data: Product data include standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, manufacturer's printed statements of compliances and applicability, catalog cuts, product photographs, production or quality control inspection and test reports and certifications, and product warranties.

2.5 Samples: Samples specified in individual sections include physical samples of the items to be used in the work.

2.6 Product data and samples shall also include, if requested by the Contracting Officer, items of disposable clothing, safety equipment, breathing apparatus, communication devices, items of equipment to be used on the site, and any other items which are required for the safety and health of all personnel on the site.

3. CONTRACTOR'S RESPONSIBILITIES:

3.1 The Contractor shall review shop drawings, product data, and samples prior to submission to determine and verify the following:

3.2 Field measurements.

3.3 Field construction criteria.

3.4 Catalog numbers and similar data.

3.5 Conformance with the Specifications, Protocol, and Contingency Plans.

3.6 Notify the Contracting Officer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

3.7 The review and approval of shop drawings, samples or catalog data by the Contracting Officer will not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Contracting Officer will have no responsibility therefore.

3.8 No portion of the work requiring a shop drawing, working drawings, sample, or catalog data shall be started nor shall any materials be fabricated, installed or used on this site prior to the approval or qualified approval of such items. Fabrications performed, materials purchased or onsite construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Government will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

3.9 Project work, materials, fabrication, and installation shall conform with approved shop drawings, working drawings, applicable samples, and catalog data.

4. GENERAL PROCEDURES FOR SUBMITTALS:

4.1 The submittals shall be promptly made in accordance with the procedures described in the CONTRACT CLAUSE(S) and SPECIAL CLAUSE SC-5.2 of these specifications. The submission requirements, review process, and final distribution of the submittals shall be as specified in the CONTRACT CLAUSE(S) and as specified hereinafter.

4.2 Submittal Register: Within 10 days after receipt of a Notice to Proceed, the Contractor shall complete and submit to the Contracting Officer for approval, six copies of ENG Form 4288 SUBMITTAL REGISTER (provided by the Contracting Officer). No site work shall commence until the submittal register is approved. A completed ENG From 4288 is included as an attachment to this SECTION. A minimum of one form shall be assigned to each specification section on which shall be listed each item of equipment and material of each type for which fabricator's drawings and/or related descriptive data, test reports, samples, spare parts list, O&M manuals, or other types of submittals are required by the specifications. Additional ENG Forms 4288 will be furnished to the Contractor by the Contracting Officer.

4.3 Instructions for Register.

4.3.1 Columns "c" through "o" of ENG Form 4288 will be completed by the Government. The Contractor shall complete columns "p" through "r" within ten calendar days after the Notice to Proceed and return six completed copies to the Contracting Officer's Representative for approval. Column "a" shall be used later for recording the respective submittal identification number inserted on each Submittal Form. Column "b" may be used for an additional control number which shall be coordinated with the Contracting Officer's Representative. During the duration of the contract, columns "s" through "u" shall be completed by the Contractor and columns "v" and "w" will be completed by the Government. Column "x" will be used for "Tech Review" as well as for "Remarks".

4.3.2 The order of listing of items on the register shall conform to the chronological sequence of each item as it occurs in the contract specification sections.

4.3.3 Drawings of component items forming a system or that are interrelated shall be scheduled to be correlated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 20 calendar days) will be allowed on the register for review and approval and possible submittal of any items subject to approval, including coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities, because no delay damages or time extensions will be allowed for time lost in late submittals or resubmittals for such items.

4.4 The Contracting Officer will review the Submittal Register for approval action. The column designated "Tech Review" will also be completed by the Contracting Officer to establish the correct addressees below for direct mailing of submittals by the Contractor. A copy of the Submittal Register, so marked in the Tech Review column, will be promptly returned to the Contractor.

4.5 The approved register shall become a part of the contract and the Contractor shall be subject to the requirements thereof. The Contractor shall revise and/or update the register monthly to take into account all changes in the contract. Each such revised addition and/or revision to the register shall be submitted to the Contracting Officer for approval. This register and the progress schedules shall be coordinated.

5. SUBMITTAL PROCESS:

5.1 The Contractor shall submit all items listed on the contract drawings and listed or specified in the other sections of these specifications. The Contracting Officer may request submittals, in addition to those listed, when deemed necessary to adequately describe the work covered in the respective sections. Submittals shall be made in the respective number of copies as specified in the Contract Clauses. Each submittal shall be completed and in sufficient detail for ready determination of compliance with the contract requirements. Prior to submittal, all items shall be checked and approved by the Construction Quality Control (CQC) Engineer and each respective submittal form shall be stamped, initialed, and dated by the CQC Engineer certifying that the accompanying submittal complies with the contract requirements.

5.2 The Contractor shall carefully control his procurement operations to assure that each individual submittal is made on or before the corresponding date scheduled on his approved "SUBMITTAL REGISTER".

5.3 Payment for materials incorporated into the work will not be made if required approvals have not been obtained.

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SUBMITTAL REGISTER (ER415-1-10)			TITLE AND LOCATION																
			CONTRACTOR												CONTRACT NUMBER				
NAS ACTIVITY CODE I J	Specification Identification (Item Number)	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL							ACTION ELEMENT	CONTRACTOR SCHEDULE DATES			CORPS ACTION DATES		REMARKS
				DRWGS	SAMPLE	GUARANT	MFG DATA	CERTIF	TEST RPT	OTHER	TECH REVIEW BY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	SUBMITTED TO CORPS	ACTION CODE	
		01030 1.4.1	Site specific Health and Safety Plan for PAFB review							X							
		01050 2.2.1	Daily Construction Progress Reports							X							
		01050 5.1	Surveyor and engineer qualification							X							
		01050 5.2	Verification of field engineering accuracy							X							
		01050 5.3	Certified survey of elevations and locations of work (AutoCad format)							X							
		01050 6.3	Copy of all field engineering notes and other record documents							X							
		01201 2.2.1	Prior to Pre-Work Conference (15 copies) Progress Chart and Preliminary Network Analysis							X							
		01201 2.2.2	15 copies of Health and Safety Plan (see 01030 1.4.1)							X							
		01201 2.2.3	15 copies of Quality Control Plan							X							
		01201 2.2.4	15 copies of Environmental Protection Plan							X							
		01310 1.3	3 weeks prior to Pre-Work Conference 15 copies of Construction Schedule (CPM)							X							
		01310 2.1	Monthly Progress Reports							X							
		01343 2.1	2 copies of Installation Data for materials and equipment				X			X							
		01370 3.0	2 copies of Schedule of Values or list of the cost of the work							X							
		01380 1.2	Photographer's qualifications and experience							X							
		01380 3.1	Furnish 3 prints of each photograph							X							
		01411 2.2	Inspection Report of Contractor's Testing Laboratory						X								

*AE – Architect Engineer ED – Engineering Division CD – Construction Division AREA – Area Engineer RE – Resident Engineer

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SUBMITTAL REGISTER (ER415-1-10)			TITLE AND LOCATION																
			CONTRACTOR												CONTRACT NUMBER				
NAS ACTIVITY CODE I J	Specification Identification (Item Number)	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL							ACTION ELEMENT TECH REVIEW BY	CONTRACTOR SCHEDULE DATES			CORPS ACTION DATES		REMARKS
				DRWGS	SAMPLE	GUARANT	MFG DATA	CERTIF	TEST RPT	OTHER		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	SUBMITTED TO CORPS	ACTION CODE	
		01411 2.3	Testing Laboratory's qualifications and letter of committment							X							
		01411 2.4.2	Testing Laboratory Certificate of Calibration					X									
		01430 4.0	Environmental Protection Plan (see 01201 2.2.4)							X							
		01500 9.6	Security Plan							X							
		01700 1.3.1	Certification of compliance with Contract Documents							X							
		01700 1.4	Contractor's closeout submittals; project records and payment receipts							X							
		01700 1.5	Final statement of account							X							
		01720 5.1	Record Documents (see 01700 1.4)							X							
		02050 1.3.1	Method of dismantling and relocation of obstacle course							X							
		02225 1.5.1	Excavation plan in accordance with OSHA 1926 Subpart P							X							
		02225 1.5.2	Test Reports – Field density tests and optimum moisture – maximum density curves						X								
		02225 1.5.2.3	Representative bulk samples		X												
		02225 1.5.3	Stormwater Management Plan							X							
		02226 1.4.1	Test reports – field density, opt. moisture – maximum density curves, friction angle						X								
		02226 1.4.2	Representative samples		X												
		02275 1.4.1	Representative samples of general backfill (document source)		X												
		02275 1.4.2	Test reports – particle size distr. and optimum moisture – density curves						X								

*AE – Architect Engineer ED – Engineering Division CD – Construction Division AREA – Area Engineer RE – Resident Engineer

SUBMITTAL REGISTER (ER415-1-10)			TITLE AND LOCATION															
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				DRWGS	SAMPLE	GUARANT	MFG DATA	CERTIF	TEST RPT	OTHER	TECH REVIEW BY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY*	SUBMITTED TO CORPS	ACTION CODE	
		02275 1.5	Certified Clean (TCLP)						X								
		02276 1.4.1	Representative samples of select fill (document source location)		X												
		02276 1.4.2	Test Reports – particle size distribution, permeability and maximum index density						X								
		02276 1.5	Certified Clean (TCLP)						X								
		02277 1.3.1	Representative samples of crushed rock		X												
		02277 1.3.2	Current NYSDOT certification letters					X									
		02277 1.3.3	Lab reports demonstrating compliance with NYSDOTSS						X								
		02277 1.3.4	Test reports – particle size dist. and permeability						X								
		02430 1.3.1	Shop drawings for diversion and transition structures	X													
		02431 1.3.1	Shop drawings for culvert and temporary abridgement of open trench	X													
		02431 1.3.2	Test reports – field density tests for each material in pipe trench						X								
		02451 1.4.1	Manufacturer's guard rail data – shop drawings and installation instructions	X			X										
		02480 1.3.1.1	Planting schedule						X								
		02480 1.3.1.2	Seed manufacturer's specification and installation instructions				X										
		02480 1.3.1.3	Seed mixture certificates					X									
		02480 1.3.2.1	Maintenance instructions for PAFB							X							
		02480 1.3.3	Written guarantee			X											

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SUBMITTAL REGISTER (ER415-1-10)			TITLE AND LOCATION																
			CONTRACTOR													CONTRACT NUMBER			
NAS ACTIVITY CODE I J	Specification Identification (Item Number)	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL							ACTION ELEMENT	CONTRACTOR SCHEDULE DATES			CORPS ACTION DATES		REMARKS
				DRWGS	SAMPLE	GUARANT	MFG DATA	CERTIF	TEST RPT	OTHER	TECH REVIEW BY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	SUBMITTED TO CORPS	ACTION CODE	
		02920 1.4.4	Certified clean (TCLP)						X								
		02920 1.5.1.1	Topsoil borrow source information							X							
		02920 1.5.1.2	Soil amendments manufacturer's specifications	X													
		02920 1.5.2.1	Particle size distribution test results						X								
		02920 1.5.2.2	pH test results						X								
		02920 1.5.2.3	Percent clay test results						X								
		02920 1.5.2.4	Percent organics test results						X								
		06300 1.4.2.1	Shop drawings	X													
		06300 1.4.2.2	Samples of each geosynthetic		X												
		06300 1.4.2.2	Manufacturer's QC manual and other data				X										
		06400 1.4.1	Shop drawings for geomembrane	X													
		06400 1.4.2	Geomembrane installer's subgrade inspection reports							X							
		06400 1.4.3	Geomembrane installer's final report							X							
		06400 1.4.4	Affidavit of compliance for geomembrane materials			X											
		06400 1.4.5	Geomembrane manufacturers QC test reports						X								
		06400 1.4.6	Geomembrane fabricators QC test reports						X								
		06400 1.4.7	Fabricated geomembrane samples		X												
		06400 1.4.8	Geomembrane fabricators logs							X							

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SUBMITTAL REGISTER (ER415-1-10)	TITLE AND LOCATION																
	CONTRACTOR												CONTRACT NUMBER				
NAS (1) ACTIVITY CODE I J	Specification Identification (Item Number)	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL							ACTION ELEMENT	CONTRACTOR SCHEDULE DATES			CORPS ACTION DATES		REMARKS
				DRWGS	SAMPLE	GUARANT	MFG DATA	CERTIF	TEST RPT	OTHER	TECH REVIEW BY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	SUBMITTED TO CORPS	ACTION CODE	
		06400 1.4.9	Notarized letter stating experience of geomembrane installer							X							
		06400 1.4.10	Coupon samples of field-seamed geomembranes		X												
		06400 1.4.11	Geomembrane field seam test reports						X								
		06400 1.5.1	Geomembrane material warranty			X											
		06500 1.3.3.1	Cold weather installation plan	X						X							
		06500 1.3.3.2.3	Geomembrane installers cold weather seam testing report	X													
		06500 1.3.3.4	Cold weather installation schedule														
		06500 1.3.3.6	Results of cold crack tests						X								
		06600 1.5.1	Shop drawings	X													
		06600 1.5.2	Certificates of compliance					X									
		15351 1.4.1	Shop drawings	X													
		15351 1.4.3	Certificates of compliance					X									
		15361 1.3.1	Shop drawings	X													

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SECTION 01310

CONSTRUCTION SCHEDULE

1. GENERAL:

1.1 In order to assure completion of the Work within the time stipulated, all activities of the Contractor will be scheduled and monitored by use of the critical path method (CPM) utilizing both activity diagram and computer printout.

1.2 The schedule, including the printout and arrow diagram, shall be prepared by an expert having substantial experience in critical path scheduling.

1.3 The Contractor shall submit 15 copies of the schedule for approval at least three weeks prior to the Pre-Work Conference.

1.4 The schedule shall be detailed in nature and shall include the calendar dates of start and completion of each task on the critical path as well as dates and float times of tasks not on the critical path and of tie-ins to existing facilities, if any. The critical path diagram shall show all activities in detail and the computer printout shall include for each activity its number, description, duration, early start, early finish, late start, late finish, and float time. Both the initial and subsequent submission shall be time scaled.

1.5 In the preparation of the schedule the Contractor shall take into consideration shop drawing submittal and approval time, the delivery times of equipment and materials, subcontractors' work, availability and abilities of workmen, weather conditions, any restrictions in operations at the Work site and disposal site, limitations in transportation, and all other items that may affect completion of the Work within the time requirements of the Contract Documents.

1.6 If the schedule as submitted by the Contractor is not sufficiently detailed, contains errors, or is unrealistic, it will be rejected in writing, and the Contractor shall submit an appropriately revised schedule within 7 days of the date of the notice of rejection. The procedure will be repeated as often as may be necessary until the schedule is found acceptable and is approved by the Contracting Officer.

1.7 Pending approval of the construction schedule no progress payment will be made except in such amounts as may be approved by the Contracting Officer for materials received at the Project site as provided in the terms of the Contract.

2. MONTHLY PROGRESS REPORTS:

2.1 On or about the first working day of each month the Contracting Officer will meet with the Contractor. At this meeting, the Contractor shall present, in duplicate, a report of operations during the preceding period, including actual starting and ending dates of activities shown on the critical path diagram.

2.2 Where such starting or ending dates were delayed beyond those required by the critical path schedule, the Contractor shall describe the action he is taking to regain lost time and state the anticipated completion dates of subsequent activities affected by the delayed items. The Contractor shall also point out known or anticipated delays on continuing activities and outline the action he is taking to regain lost time or avoid future delay.

3. REVISION OF CRITICAL PATH DIAGRAM

3.1 The critical path diagram shall be revised every 3 months during the Project to reflect departures and changes from the previous critical path diagram. If departures and changes during the previous period are of such minor nature that no useful purpose is served by revising the critical path diagram, the Contracting Officer may waive this requirement.

3.2 The Contractor shall furnish 8 copies of the revised critical path diagram and accompanying computer printout to the Contracting Officer within 15 days from the date its preparation is directed.

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SECTION 01341

SHOP DRAWING PROCEDURES

1. GENERAL

1.1 Shop Drawing procedures shall conform to requirements as described in this Section.

2. PROCEDURE

2.1 Submit Shop Drawings to: _____
_____
_____

Submit additional copy to the Resident Project Representative at address provided by Contracting Officer.

2.2 A letter of transmittal in duplicate shall accompany each submittal. If data for more than one Section of the Specifications is submitted, a separate transmittal letter shall accompany the data submitted for each Section.

2.3 At the beginning of each letter of transmittal provide a reference heading indicating the following:

2.3.1 Contracting Officer's Name_____
2.3.2 Project Name _____
2.3.3 Contract No. _____
2.3.4 Transmittal No. _____
2.3.5 Section No. _____

2.4 If a Shop Drawing deviates from the requirements of the Contract Documents, Contractor shall specifically note each variation in his letter of transmittal.

2.5 All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to Contracting Officer.

2.6 All Shop Drawings submitted shall bear the stamp of approval and signature of Contractor as evidence that they have been reviewed by Contractor. Submittals without this stamp of approval will not be reviewed by Contracting Officer and will be returned to Contractor. Contractor's stamp shall contain the following minimum information:

Project Name: _____

Contractor's Name: _____

Date: _____

----------Reference----------

Item: _____

Specifications:

Section: _____

Page No.: _____

Paragraph No.: _____

Drawing No.: _____ of _____

Location: _____

Submittal No.: _____

Approved By: _____

2.7 A number shall be assigned to each submittal by Contractor starting with No. 1 and thence numbered consecutively. Resubmittals shall be identified by the original submittal number followed by the suffix "A" for the first resubmittal, the suffix "B" for the second resubmittal, etc.

2.8 Contractor shall initially submit to the Contracting Officer a minimum of 3 copies of all submittals that are on 8-1/2-inch by 11-inch, and one unfolded sepia and 2 prints made from that sepia for all submittals on sheets larger than 8-1/2-inch by 11-inch. The Resident Project Representative shall receive one copy only of each submittal which will be stamped "Preliminary - Not For Construction."

2.9 After Contracting Officer completes his review, Shop Drawings will be marked with one of the following notations:

2.9.1 Approved
2.9.2 Approved as Corrected
2.9.3 Revise and Resubmit
2.9.4 Not Approved

2.10 If a submittal is acceptable, it will be marked "Approved" or "Approved as Corrected". Four prints or copies of the submittal will be returned to Contractor.

2.11 Upon return of a submittal marked "Approved" or "Approved as Corrected", Contractor may order, ship or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.

2.12 If a Shop Drawing marked "Approved as Corrected" has extensive corrections or corrections affecting other drawings or Work, Contracting Officer may require that Contractor make the corrections indicated thereon and resubmit the Shop Drawings for record purposes. Such drawings will have the notation, "Approved as Corrected - Resubmit."

2.13 If a submittal is unacceptable, 2 copies will be returned to Contractor with one of the following notations:

2.13.1 "Revise and Resubmit"
2.13.2 "Not Approved"

2.14 Upon return of a submittal marked "Revise and Resubmit", Contractor shall make the corrections indicated and repeat the initial approval procedure. The "Not Approved" notation is used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, Contractor shall repeat the initial approval procedure utilizing acceptable material or equipment.

2.15 Any related Work performed or equipment installed without an "Approved" or "Approved as Corrected" Shop Drawing will be at the sole responsibility of the Contractor.

2.16 Shop Drawings shall be submitted well in advance of the need for the material or equipment for construction and with ample allowance for the time required to make delivery of material or equipment after data covering such is approved. Contractor shall assume the risk for all materials or equipment which are fabricated or delivered prior to the approval of Shop Drawings. Materials or equipment will not be included in periodic progress payments until approval thereof has been obtained in the specified manner.

2.17 Contracting Officer will review and process all submittals promptly, but a reasonable time should be allowed for this, for the Shop Drawings being revised and resubmitted, and for time required to return the approved Shop Drawings to Contractor.

2.18 It is Contractor's responsibility to review submittals made by his suppliers and Subcontractors before transmitting them to Contracting Officer to assure proper coordination of the Work and to determine that each submittal is in accordance with his desires and that there is sufficient information about materials and equipment for Contracting Officer to determine compliance with the Contract Documents. Incomplete or inadequate submittals will be returned for revision without review.

2.19 Contractor shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within three submittals. All costs to Contracting Officer involved with subsequent submittals of Shop Drawings, Samples or other items requiring approval, will be backcharged to Contractor, at the rate of 3.0 times direct technical labor cost, by deducting such costs from payments due Contractor for Work completed. In the event that Contractor requests a substitution for a previously approved item, all of Contracting Officer's costs in the reviewing and approval of the substitution will be backcharged to Contractor unless the need for such substitution is beyond the control of Contractor.

* * * * * *

SECTION 01342

SAMPLES

1. GENERAL

1.1 The submittal of Samples shall conform to the requirements described in this SECTION.

1.2 Samples and Shop Drawings which are related to the same unit of Work or Specification Section shall be submitted at the same time. If related Shop Drawings and Samples are submitted at different times, they cannot be reviewed until both are furnished to the Contracting Officer.

2. PROCEDURE

2.1 Contractor shall review, approve, and submit all Samples promptly. Samples shall be identified with correct reference to Specification Section, page, article and paragraph number, and Drawing No. when applicable. Samples shall clearly illustrate functional characteristics of the product and all related parts and attachments, and full range of color, texture, pattern and material. Samples shall be furnished so as not to delay fabrication, allowing the Contracting Officer reasonable time for the consideration of the Samples submitted.

2.2 Contractor shall submit at least three Samples of each item required for the Contracting Officer's approval. Submission of Samples shall conform to all applicable provisions under Shop Drawing Submittal and Correspondence Procedure. One of the Samples shall be delivered to the Contracting Officer's home office unless otherwise authorized by the Contracting Officer. One Sample shall be delivered to the Contracting Officer's field office. If the Contractor requires a Sample for his use he shall notify the Contracting Officer in writing.

2.3 The Contractor shall make all corrections required and shall resubmit the required number of new Samples until approved.

3. SAMPLES FOR TESTS

3.1 Contractor shall furnish such Samples of material as may be required for examination and test. All Samples of materials for tests shall be taken according to standard methods and as required by the Contract Documents.

* * * * * *

SECTION 01343

INSTALLATION DATA

1. GENERAL

1.1 Installation data are defined as written instructions; drawings; illustrative, schematic diagrams; diagrams identifying external connections, and all other such information pertaining to installation of materials and equipment that is not furnished with Shop Drawings. Included are all printed manufacturers installation instructions, including those that may be attached to equipment and for which approval by the Contracting Officer is not required.

2. SUBMITTAL

2.1 Contractor shall submit two copies of all such data to the Contracting Officer for each piece of equipment which he furnishes and for all other construction products for which such information is available from manufacturer. Data shall be acceptably identified and accompanied with a letter of transmittal.

* * * * * *

SECTION 01370

SCHEDULE OF VALUES

1. GENERAL: The Contractor shall prepare the Schedule of Values, which is an itemized list that establishes the value or cost of the Work. It shall be used as the basis for preparing progress payments and may be used as a basis for negotiations concerning additional work or credits which may arise during the construction.

2. PREPARATION:

2.1 The schedule shall show breakdown of labor, materials, equipment and other costs used in preparation of the Bid.

2.2 Costs shall be in sufficient detail to indicate amounts for each Lump Sum item.

2.3 Contractor may include an item for bonds under job mobilization.

2.4 Schedule of Values shall be prepared on 8-1/2-inch by 11-inch white paper.

2.5 The Bid items will provide the major headings for the Schedule. List sub-items of major products or systems as appropriate or when requested by the Contracting Officer.

2.6 The number of Items on the Schedule of Values and the costs assigned to them are subject to discussion, review and approval of the Contracting Officer. When requested by the Contracting Officer, the Contractor shall support values with data that will substantiate their correctness.

2.7 The totals of the individual values shown on the Schedule of Values must equal the totals bid for primary bid Items, but not necessarily the amounts bid for the individual sub-items under the primary Items.

2.8 Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2.9 Schedule shall show the purchase and delivery costs for materials and equipment that the Contractor anticipates he shall request payment for prior to their installation. If payment is requested for materials prior to their installation, Contractor shall provide proof of title, insurance, proposed use of items and schedule for when each item is to be incorporated into the completed Work.

3. SUBMITTAL: Submit two copies of the Schedule to the Contracting Officer for approval at least 20 days prior to submitting first application for a progress payment. After review by the Contracting Officer revise and resubmit Schedule as required until it is approved.

* * * * * *

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

1. GENERAL

1.1 Contractor shall retain a professional photographer to perform the services specified below.

1.2 The Contractor shall obtain Contracting Officer's approval of the photographer selected prior to taking first photographs. Submit qualifications and experience record of photographer.

2. PHOTOGRAPHS

2.1 Take a minimum of 264 color photographs during the construction period.

2.2 Take a minimum of 24 color photographs of the completed or substantially completed Work.

2.3 Photographs shall be taken approximately twice each month.

2.4 Contracting Officer will approve the views to be taken and select the time at which they will be taken.

2.5 A minimum of 5 photographs will be taken each time the photographer is at the site.

3. PRINTS

3.1 Furnish three prints of each photograph to the Contracting Officer as soon as they are available from the photographer.

3.2 Furnish additional photographs or prints requested by Contracting Officer at cost.

3.3 Provide high quality 4-inch by 6-inch standard weight prints with a glossy finish.

3.4 Place the following information on the back of each print:

3.4.1 Date photograph was taken.

3.4.2 Title of Project.

3.4.3 Description of view shown in photograph.

3.4.4 Name and address of photographer.

3.4.5 Photographer's numbered identification of exposure.

* * * * * *

SECTION 01400

CONSTRUCTION QUALITY CONTROL PROGRAM

1. GENERAL

1.1 The Contractor shall establish and maintain an effective construction quality control program in compliance with requirements indicated herein and elsewhere in the Contract Documents. The quality control program shall consist of plans, procedures, and organization necessary to assure that operations comply with Contract Documents. The program shall cover construction operations, both on and off the site, and shall be coordinated with the project schedule.

1.2 QUALITY CONTROL PLAN

1.2.1 The Contractor shall begin construction only after acceptance of the Construction Quality Control (CQC) Plan. The Contractor shall develop procedures for purchasing, receiving and storing materials and equipment; subcontracting; processing shop drawings, samples, certificates, and other submittals; monitoring and controlling excavation, grading and backfilling operations; and managing and controlling his construction operations to comply with the requirements of the Contract. The CQC Plan the Contractor proposes to implement shall include, but shall not be limited to, the following.

1.2.1.1 A description of the CQC management organization, including a chart showing lines of authority and acknowledgment that the quality control system specified will be implemented for all aspects of the work specified. The plan shall also indicate the name and position within the Contractor's management structure of the individual to whom the CQC manager reports.

1.2.1.2 The names, classifications, qualifications, duties, responsibilities, and authority of all CQC personnel.

1.2.1.3 A list of all definable features of work for the project. This list shall indicate approximate dates when preparatory and initial phases will be performed in accordance with requirements herein, and shall be coordinated with work schedule.

1.2.1.4 CQC activities to be performed, including those of subcontractors, off-site fabricators, suppliers and purchasing agents.

1.2.1.5 Control testing procedures for soils and materials to be incorporated in the work.

1.2.1.6 Documentation format for CQC activities and testing.

1.2.1.7 Procedures for scheduling and managing submittals including reports, samples, certificates and other submittals.

1.2.2 Corrective Actions. If at any time it is determined that the CQC system, personnel, instructions, controls, test or records are not providing construction which conforms to the Contract Documents, the Contractor shall correct the system deficiencies. Contractor's delay in making appropriate corrective action will be cause to withhold payment of all or a portion of the next scheduled monthly estimate or all or a portion of any future monthly estimates until corrective action is taken.

* * * * * *

SECTION 01411

TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR

1. GENERAL

1.1 Laboratory services shall conform to all requirements of the Contract Documents and as described in this SECTION.

1.2 Contractor shall employ and pay for an independent testing laboratory to perform the specified services. Laboratory selected shall be subject to approval by the Contracting Officer.

1.3 Inspection, sampling and testing shall be as specified in the individual SECTIONS. These include but are not limited to:

1.3.1 SECTION 02225: EXCAVATION AND BACKFILL

1.3.2 SECTION 02226: FINAL COVER CONSTRUCTION

1.3.3 SECTION 02275: GENERAL BACKFILL

1.3.4 SECTION 02276: SELECT FILL

1.3.5 SECTION 02277: CRUSHED ROCK

1.3.6 SECTION 02431: CULVERT CONSTRUCTION

1.3.7 SECTION 02480: HYDROSEEDING

1.3.8 SECTION 02920: TOPSOIL

1.3.9 SECTION 06300: GEOSYNTHETICS

1.3.10 SECTION 06400: PVC GEOMEMBRANE

1.3.11 SECTION 06450: PVC COMPOSITE GEOMEMBRANE

2. QUALIFICATIONS OF LABORATORY

2.1 Where applicable, meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories. Laboratory shall be authorized to operate in the State of New York and be validated by the Corps of Engineers.

2.2 Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

2.3 The Contractor shall submit the name, qualifications and letter of committment from the testing laboratory to be used with the Contractor's bid.

2.4 Testing Equipment:

2.4.1 Calibrated at maximum 12 month intervals by devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

2.4.2 Submit copy of certificate of calibration, made by accredited calibration agency.

3. LABORATORY DUTIES

3.1 Cooperate with Contracting Officer and provide qualified personnel promptly on notice.

3.2 Perform specified inspections, sampling and testing of materials and methods of construction; comply with applicable standards; ascertain compliance with requirements of Contract Documents.

3.3 Promptly notify Contracting Officer, of irregularities or deficiencies of Work, which are observed during performance of services.

3.4 Promptly submit 5 copies of reports of inspections and tests to Contracting Officer, including:

- Date issued.
- Project title and number.
- Testing laboratory name and address.
- Name and signature of inspector.
- Date of inspection or sampling.
- Record of temperature and weather.
- Date of test.
- Identification of product and Specification Section.
- Location in Project.
- Type of inspection or test.
- Results of tests and observations regarding compliance with Contract Documents.

3.5 Perform additional tests and services as required to assure compliance with the Contract Documents.

4. CONTRACTOR'S COORDINATION WITH LABORATORY

4.1 Cooperate with laboratory personnel, provide access to Work and to manufacturer's operations.

4.2 Provide to laboratory, representative samples of materials to be tested, in required quantities.

4.3 Furnish labor and facilities:
- to provide access to Work to be tested.
- to obtain and handle samples at the site.
- to facilitate inspections and tests.
- for laboratory's exclusive use for storage and curing of test samples; and
- forms for preparing concrete test cylinders

4.4 Notify laboratory and Contracting Officer sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

4.5 Arrange with laboratory and pay for, additional samples and tests required for Contractor's convenience.

5. PRODUCT TEST REPORTS

5.1 Furnish copies of product test reports where required by the Specifications or requested by Contracting Officer.

* * * * * *

SECTION 01430

ENVIRONMENTAL PROTECTION

1. SCOPE: This section covers prevention of environmental pollution and damage as the result of construction operations under this Contract and for those measures set forth in other Technical Provisions of these specifications. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics; natural resources; noise; solid waste; radiant energy and radioactive materials, as well as other pollutants.

1.1 Related Sections:

1.1.1 SECTION 01460: HEALTH AND SAFETY REQUIREMENTS
1.1.2 SECTION 02100: CLEARING AND SITE CLEANING.

2. QUALITY CONTROL: The Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports any problems or potential problems in complying with laws, regulations and ordinances and corrective action taken.

3. CONFORMANCE WITH LAWS AND REGULATIONS

3.1 The Contractor shall comply with all applicable, relevant and appropriate requirements which shall include, but not be limited to, the following Laws, Rules and Regulations. For further definition, refer to the Appendices of these specifications.

3.1.1 New York State (NYS) Solid Waste Management Facilities Regulations (NYCRR Part 360)

3.1.2 Fish and Wildlife Coordination Act Requirements

3.1.3 Federal Wetlands Executive Order 11990

3.1.4 New York State Environmental Conservation Law, Freshwater Wetlands Act

3.1.5 Federal Endangered Species Act Requirements

3.1.6 New York State Endangered Species Standards

3.1.7 Federal Floodplain Management Executive Order 11988

3.1.8 New York State Flood Hazard Area Construction Standards

3.1.9 National Pollutant Discharge Elimination System (NPDES)

3.1.10 New York State Pollutant Discharge Elimination System (SPDES), Water Quality Standards

3.1.11 National Historic Preservation Act (NHPA)

3.1.12 Section 121 of CERCLA, as amended by SARA 1986

3.1.13 New York State Solid Waste Facility Standards

3.1.14 Federal Register (Volume 48, No. 190, Sept. 1983) Reference for Stabilization of Historic Structures - Guidelines

4. SUBMITTALS: The Contractor shall submit an environmental protection plan a minimum of three weeks prior to the Pre-Work Conference as specified in SECTION 01201: PRE-CONSTRUCTION AND PRE-WORK CONFERENCE.

4.1 The Environmental Protection Plan shall include but not be limited to providing the following:

4.1.1 A list of Federal, State and local laws, regulations, and permits concerning environmental protection, pollution control and abatement, and natural and other resource protection that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations and permits.

4.1.2 Methods for protection of features to be preserved within the project limits as defined by the contract drawings as well as the zones of impact which include the limited transport routes through the City of Plattsburgh or PAFB.

4.1.3 Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes or failure to follow the procedures set out in accordance with the environmental protection plan.

4.1.4 Permit or license and the location of all waste disposal facilities proposed for disposition of project wastes. The Contractor shall also provide a statement of commitment in writing from each proposed facility acknowledging its readiness to accept specific project wastes.

4.1.5 Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

4.1.6 Environmental monitoring plans for the job site during the construction shall be compatible with SECTION 01460: HEALTH AND SAFETY PROCEDURES.

4.1.7 Traffic control plan.

4.1.8 Methods of protecting surface and ground water during construction activities.

4.1.9 Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

4.2 Implementation: At least three weeks prior to the Pre-Work Conference but not more than thirty (30) calendar days after receipt of Notice to Proceed, the Contractor shall submit in writing the above Environmental Protection Plan. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures.

5. SUBCONTRACTORS: Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

6. NOTIFICATION: The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits and other elements of the Contractor's Environmental Protection Plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No costs or damages shall be allowed to the Contractor for any such suspension. Time extensions shall not be allowed to the Contractor except, under extenuating circumstances, as determined by the Contracting Officer and approved in writing.

7. PROTECTION OF ENVIRONMENTAL RESOURCES: The environmental resources within the project boundaries and those affected outside the limits of permanent work under this Contract shall be protected during the entire period of this Contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

7.1 Protection of Land Resources. Prior to the beginning of any construction, the Contracting Officer shall identify all land resources to be preserved within the Contractor's work area. The Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

7.1.1 Work Area Limits. Prior to any construction the Contractor shall mark the areas that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or protected by temporary fencing. Monuments and markers shall be protected before construction operations commence. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

7.1.2 Protection of Landscape.

7.1.2.1 Trees, shrubs, vines, grasses, land forms and other landscape features directed by the Contracting Officer to be preserved shall be clearly identified by marking, fencing, or any other approved techniques.

7.1.2.2 The Contractor shall be responsible for protection of the above features to be left undisturbed whether located inside or outside the project boundary as specified and shown on the drawings.

7.1.3 Reduction of Exposure of Unprotected Erodible Soils. Earthwork brought to final grade shall be finished as indicated and specified. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in instances where the constructed feature obscures borrow areas, quarries and waste material areas, these areas shall not initially be cleared in total. Clearing of such areas shall progress in reasonably sized increments as needed. The areas to be developed shall be approved by the Contracting Officer.

7.1.4 Temporary Protection of Disturbed Areas. Such methods as necessary shall be utilized to effectively prevent erosion and control sedimentation. Runoff from the construction site shall be controlled by construction of diversion ditches, benches, and berms to divert runoff to protected drainage courses, and any measures required by area-wide plans approved under paragraph 208 of the Clean Water Act.

7.1.5 Erosion and Sedimentation Control Devices. The Contractor shall construct or install all temporary and permanent erosion and sedimentation control features as indicated on the Contract Drawings. Temporary erosion and sediment control measures shall be maintained until the project is substantially complete and the original drainage patterns are restored.

7.1.6 Location of Field Offices, Storage and Other Contractor Facilities. The Contractor's field offices, staging areas, and temporary buildings shall be placed in areas designated on the Contract Drawings. Temporary movement or relocation of Contractor facilities, except those shown conceptually only, shall be made only on approval by the Contracting Officer.

7.1.7 Temporary Excavations and Embankments for work areas shall be controlled to protect adjacent areas from contamination.

7.1.8 Disposal of Solid Wastes. Non-hazardous solid wastes to be removed from the site, excluding clearing debris, shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination. No burning will be permitted on the site. Clearing debris shall be treated, handled and disposed of in accordance with the requirements of SECTION 02100: CLEARING AND SITE CLEANING.

7.1.9 Disposal of Chemical Waste. Chemical waste, except where specified under the requirements of SECTION 02100: CLEARING AND SITE CLEANING or any other sections applying to waste removals considered to be site remediation tasks, shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State and local regulations.

7.1.10 Disposal of Non-Hazardous Discarded Materials. Discarded materials other than those which can be included in the solid waste category which cannot be placed in a container will be handled as directed by the Contracting Officer.

7.2 Protection of Water Resources. The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground water inside and outside the Project site. Special management techniques as set out below shall be implemented to control water pollution by the listed construction activities which are included in this contract.

7.3 Wastewater. Waste waters directly derived from any process producing wastewater during construction shall not be allowed to enter water areas outside of the Project boundaries. These waste waters shall be collected and placed in tanks or diverted to the detention basin in the disposal area so that suspended material can be settled out prior to discharge.

7.4 Protection of Wildlife Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of wildlife. Species that require specific attention along with measures for their protection will be listed by the Contractor and submitted to the Contracting Officer prior to beginning of construction operations.

7.5 Protection of Air Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with New York State air pollution regulations including, but not limited to, NYCRR Part 211 - General Prohibitions, Part 218 - Vehicles Propelled by Diesel Engines and Part 256 - Ambient Air Quality Standards. Ambient Air Quality Standards set by the Environmental Protection Agency, as specified in 40 CFR Part 50, shall be maintained for those construction operations and activities specified in this section. Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

7.5.1 Particulates.

7.5.1.1 Dust particles, aerosols, and gaseous by-products from all construction activities, processing and preparation of materials shall be controlled at all times, including weekends, holidays and hours when work is not in progress.

7.5.1.2 The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned in Subsection 7.5: Protection of Air Resources to be exceeded or which would cause a hazard or a nuisance. Sprinkling will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

7.5.1.3 The Contractor shall take appropriate measures to control fugitive dust generation and migration during construction activities. Fugitive dust suppression, particulate monitoring and action levels for such shall conform to the requirements of New York State Department of Environmental Conservation Guidance HWR-89-4031 dated October 27, 1989; a copy of which is in the Appendices of these Specifications.

7.5.2 Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

7.5.3 Monitoring Air Quality. The Contractor shall be responsible for monitoring air quality as specified in SECTION 01460: HEALTH AND SAFETY PROCEDURES.

7.6 Noise Control. The Contractor shall keep construction activities under surveillance and control to minimize damage to the environment by noise. The Contractor shall use methods and devices to control noise emitted by equipment to levels complying with the latest OSHA standards and all applicable local noise standards. In no case shall noise levels be permitted which interfere with the Work, or others.

8. POST CONSTRUCTION CLEAN UP: The Contractor shall clean up areas used for construction within the project boundaries in conformance with SECTION 01710: FINAL SITE CLEANUP.

9. RESTORATION OF LANDSCAPE DAMAGE: The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plan submitted for approval by the Contracting Officer. This work will be accomplished at the Contractor's expense.

10. CONTRACTOR PERSONNEL IN HEALTH AND SAFETY TRAINING. The Contractor shall train his personnel in all phases of environmental protection and on-site workers who may be exposed to hazardous materials or constituents which may exist at the landfill must successfully complete OSHA's 40-hour Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) training course. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities and equipment, including instruments required for monitoring purposes, to ensure adequate and continuous environmental pollution control. The Contractor shall submit evidence of training to the Contracting Officer. Refer to SECTION 01460: HEALTH AND SAFETY REQUIREMENTS for additional requirements.

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SECTION 01460

HEALTH AND SAFETY REQUIREMENTS

1. HEALTH AND SAFETY REQUIREMENTS

1.1 A detailed site-specific health and safety plan shall be developed by Contractor to address potential hazards to Contractor, PAFB personnel, authorized site visitors and the surrounding community resulting from the Work. This plan shall be consistent with all applicable state and federal requirements. The Contractor shall prepare and submit a Health and Safety Plan to the Contracting Officer prior to the start of any work. The Contractor shall designate a responsible member of his organization at the site whose duty shall be that of a Site Safety Officer. At a minimum, the Health and Safety Plan shall address the following issues.

1.1.1 Introduction: Historical overview of the site, scope and applicability of Site Health and Safety Plan, Visitor Requirements, and a brief summary of the Work

1.1.2 Key Personnel: Identification of site-specific personnel responsibilities, organizational responsibilities.

1.1.3 Task/Operation Safety and Health Analysis: The evaluation of hazards based upon knowledge of site background and anticipated risks posed by the specific operations. Contractor shall address the characteristics, toxicity and potential risks associated with the contaminants that may be encountered. Hazard prevention and control measures should be detailed in this section.

1.1.4 Personnel Training Requirements: Contractor should demonstrate the steps that will be taken to ensure that all employers have certified that their employees have received appropriate training consistent with 29 CFR 1910.120. Identify those individuals with Site Supervisors Training. Outline applicable site-specific training and briefing topics.

1.1.5 Personal Protective Equipment: The contractor should, on the strength of the hazard assessment in Section 1.1.3, describe the level of protection anticipated for each task, any modifications to the EPA definitions of these levels, and the action levels proposed for switching from one level of protection to another.

1.1.6 Medical Surveillance: Contractor should insert their medical monitoring program documentation here.

1.1.7 Air Monitoring: Design an air monitoring program to detect and quantify the release or volatilization of soil contaminants or particulates associated with the waste excavation or other construction activities at the site. Use air monitoring data to determine appropriate levels of personnel protection and need to enact emergency response plan provisions in the event of contaminant release.

1.1.7.1 Identify which parameters are monitored.

1.1.7.2 Specify frequency necessary to establish a site-specific background and to monitor that this background is maintained.

1.1.7.3 Identify monitoring points.

1.1.7.4 Identify type(s) and quantity of air monitoring equipment.

1.1.8 Site Control Measures: The contractor should state how the work zones will be identified and defined, a site map, the site communication plan, a buddy system for entry, sign-in procedures.

1.1.9 Decontamination Plan: Standard operating procedures, equipment decontamination, disposition of decontamination wastes, personal protective equipment requirements during decontamination.

1.1.10 Emergency Response Plan: Pre-emergency planning, personnel roles and lines of authority, identification of CPR/First Aid trained individuals, evacuation routes and procedures, route map to nearest medical assistance, emergency contact notification system with telephone numbers to be posted, location of muster areas and safe distances, emergency medical treatment procedures, emergency equipment and facilities.

1.1.11 Spill Containment Program: If required, contractor will develop policies regarding drums and container procurement, inspection, transportation, storage, and the availability and use of spill control equipment.

1.1.12 Hazard Communication: A hazard communication program should be developed which addresses container labeling, material safety data sheets, employee training and information, and information sharing on multi-employer worksites.

1.2 At the commencement of the Work, Contractor's supervisors and higher level personnel shall conduct and attend a Safety Training Session at the landfill site. Furthermore, at the start of each work day, Contractor's supervisors shall hold a safety session with all personnel who may be exposed to hazardous constituents.

1.3 A baseline risk assessment was prepared as part of a Remedial Investigation of Landfill 023 completed by others. The text of the baseline risk assessment is included in the Appendices to these Specifications to assist the Contractor in preparing his Health & Safety Plan for work at Landfill 023. The complete Remedial Investigation Report is available from the Contracting Officer if the Contractor requires additional information on site conditions.

2. HEALTH AND SAFETY REQUIREMENTS FOR CONSTRUCTION OPERATIONS

2.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection, training and equipment to prevent damage, injury or loss to:

2.1.1 All employees on the Work and other persons who may be affected thereby;

2.1.2 All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site; and

2.1.3 Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

2.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

2.3 The Contractor shall provide appropriate personal protection equipment (PPE).

2.4 The Contractor shall restrict smoking, open flames or spark-producing equipment in the area as determined necessary by the Health and Safety Plan.

2.5 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from Contracting Officer, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give Contracting Officer prompt written notice of any significant changes in the work or deviations from the Contract Documents caused thereby.

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SECTION 01500

TEMPORARY CONSTRUCTION FACILITIES

1. GENERAL:

1.1 The temporary construction facilities specified in this section are the minimum required for the Project. The Contractor may provide additional facilities which he considers necessary for the proper execution of the Work and to meet his responsibilities for protection of persons and property.

1.2 Contractor shall:

1.2.1 Comply with applicable requirements specified in other SECTIONS of the Specifications.

1.2.2 Maintain and operate systems to assure continuous service.

1.2.3 Modify and extend systems as Work progress requires.

1.2.4 Completely remove temporary materials and equipment when their use is no longer required.

1.2.5 Clean and repair damage caused by temporary installations or use of temporary facilities.

1.2.6 Restore existing facilities used for temporary services to specified or to original condition.

1.3 Temporary construction facilities shall include, but are not limited to:

1.3.1 Utilities

1.3.1.1 Water
1.3.1.2 Electricity
1.3.1.3 Lighting
1.3.1.4 Telephone

1.3.2 Sanitary Facilities
1.3.3 Contracting Officer's Site Office and Contractor's Field Office
1.3.4 Personnel Hygiene and Decontamination Facilities
1.3.5 Access Roads and Parking Areas Security, Communications and Contractor's Offices
1.3.6 Emergency Medical Facility

2. TEMPORARY UTILITIES:

2.1 Basic Requirements.

2.1.1 Contractor shall make arrangements with utility service companies for temporary services and shall pay associated costs.

2.1.2 Contractor shall abide by rules and regulations of the utility service companies or authorities having jurisdiction.

2.1.3 Contractor shall be responsible for utility service costs. Included are fuel, power, light, and other utility services necessary for execution, completion, testing, and operation of the Work.

2.2 Temporary Water: Temporary water shall be provided by the Contractor.

2.2.1 Description of System.

2.2.1.1 Furnish temporary water service for use throughout the construction period.

2.2.1.2 Provide potable water and water for sanitary facilities, first aid facilities, fire protection, field offices, cleaning, decontamination stations, and dust suppression activities.

2.2.1.3 Maintain adequate volume of water for all purposes.

2.2.1.4 Water Source: Contractor may use water from PAFB potable water supply system. Contractor shall make arrangements for obtaining water from PAFB system at no cost to PAFB. Contractor shall obtain prior approval from PAFB before withdrawing water from the PAFB system. PAFB will not charge the Contractor for water usage.

2.2.1.5 Maintain strict supervision of use of temporary services:

2.2.1.5.1 Enforce conformance with applicable codes and standards.

2.2.1.5.2 Enforce sanitary practices.

2.2.1.5.3 Prevent abuse of services.

2.2.1.5.4 Prevent wasteful use of water.

2.2.1.5.5 Protect system from freezing.

2.2.2 Requirements of Regulatory Agencies.

2.2.2.1 Obtain and pay for permits, fees and deposits required by governing authorities.

2.2.2.2 Obtain and pay for temporary easements required across private property.

2.2.2.3 Comply with Federal, State and local laws, ordinances, rules and regulations, and with utility service company regulations.

2.2.3 Materials.

2.2.3.1 Materials may be new or used but must be adequate for purpose required, must be sanitary, and must not violate requirements of applicable codes.

2.2.3.2 Provide all required facilities, including piping, valves, pumps, pressure regulators, tanks and other appurtenances.

2.2.4 Installation.

2.2.4.1 Install work in a neat and orderly manner and make structurally and mechanically sound throughout.

2.2.4.2 Maintain to provide continuous service.

2.2.4.3 Modify and extend service as Work progress requires.

2.2.4.4 Locate piping and outlets to provide service convenient to work stations and to avoid interference with traffic and work areas, materials handling equipment and storage area.

2.2.4.5 Do not run piping on ground.

2.2.4.6 Provide insulation, or other means, to prevent pipes from freezing.

2.2.4.7 When necessary to maintain pressure, provide temporary pumps, tanks and compressors.

2.3 Temporary Electricity.

2.3.1 General.

2.3.1.1 Temporary electrical service shall be provided by the Contractor.

2.3.1.2 Materials and equipment may be new or used, however, they shall be in first class, fully serviceable condition and must not create unsafe conditions or violate requirements of applicable codes.

2.3.2 Power Source and Service Required.

2.3.2.1 Temporary service shall originate from the existing service pole belonging to the New York State Electric and Gas Corp. at locations along the route shown on the drawings as approved by PAFB and approved by the power company.

2.3.2.2 System shall be, at a minimum, 240 volt, 1 phase, 60 Hz with sufficient capacity to provide service for construction use and for all offices and other temporary facilities. If the Contractor requires electric power at a different voltage or phase to operate his treatment facilities, he shall make all arrangements and pay all costs for such connections as he requires.

2.3.2.3 One power center minimum shall be provided for each major piece of equipment and for each temporary construction building.

2.3.2.4 Provide each outlet with circuit breaker protection and comply with ground fault protective requirements of National Electric Code.

2.3.2.5 Provide continuous power for construction site offices.

2.3.3 Installation.

2.3.3.1 Install temporary work in a neat, orderly manner, and make structurally and electrically sound throughout.

2.3.3.2 Maintain installation throughout construction period to give continuous service and to provide safe working conditions.

2.3.3.3 Modify service and rearrange wiring as Work progress requires.

2.3.3.4 Locate all facilities to avoid interference with hoisting, materials handling, storage and traffic areas.

2.4 Telephone.

2.4.1 The Contractor shall make necessary arrangements with the telephone utility and pay charges for telephones in his offices at the site and a separate telephone line and instrument in the office of the Contracting Officer.

3. SANITARY FACILITIES:

3.1 The Contractor shall provide and maintain sanitary facilities for the use of his employees or any other persons on the job site, as may be required to comply with OSHA 29CFR 1910.120 and with the regulations of state and local departments of health.

3.2 Provide temporary sanitary facilities for use throughout the construction period including:

3.2.1 Potable water and sanitary drinking cups.
3.2.2 Sanitary drinking fountains where feasible.
3.2.3 Enclosed toilet facilities.
3.2.4 Suitable general employee washing facilities.

3.3 Maintain, service and clean facilities and keep them supplied continuously with soap, towels, paper and all other required supplies.

3.4 Necessary and adequate sanitary facilities for the use of construction personnel at the job site shall be provided by the Contractor, maintained by him in a sanitary condition, and their use enforced. Such facilities shall be enclosed. Pit-type toilets will not be permitted. No discharge will be allowed from these facilities. All sewage and waste will be collected and stored in such a manner so as not to cause a nuisance or health problem and shall be hauled off-site and properly disposed of by the Contractor.

3.5 Locate toilets near the Work site and secluded from view insofar as possible. Toilets shall be serviced at regular intervals, kept clean and supplied throughout the course of the Work.

4. CONTRACTING OFFICER'S SITE OFFICE:

4.1 Description. Furnish, install and maintain a field office for the Contracting Officer. Locate the office near the Contractor's office in a place approved by the Contracting Officer. Provide office complete within two weeks after issuance of the Notice to Proceed.

4.1.1 Provide adequate access and allocate four reserved parking spaces for use of the Contracting Officer.

4.1.2 Minimum Construction:

4.1.2.1 Structurally sound foundation and superstructure.
4.1.2.2 Completely weathertight with insulated roof and walls.
4.1.2.3 Exterior finish acceptable to Contracting Officer.
4.1.2.4 Plant-type walkway and mud scraper at door.
4.1.2.5 All new interior finishes acceptable to Contracting Officer.
4.1.2.6 Resilient floor covering in first class condition.

4.1.2.7 275 square foot minimum area.
4.1.2.8 Windows area equal to 10 percent of floor area with operable sash and screens sufficient for light, view and ventilation.
4.1.2.9 Secure, lockable exterior doors with dead bolt cylinder locks.

4.1.3 Optional Construction. Mobile office trailer in first class condition acceptable to Contracting Officer, which is specifically designed for this type of use and conforms to all requirements of this SECTION.

4.1.4 Minimum Services.

4.1.4.1 Interior lighting of 50 foot-candles at desk top height.
4.1.4.2 Exterior light at entrance.
4.1.4.3 Automatic heating to maintain 65 F in winter. Furnish and pay for all fuel.
4.1.4.4 Automatic cooling to maintain 75 F in summer.
4.1.4.5 Electric service required with all charges paid.
4.1.4.6 Four electric wall outlets.
4.1.4.7 Private telephone service. Contractor shall pay installation charges and monthly local charges throughout the Project. Include an outside bell.
4.1.4.8 Chilled drinking water.
4.1.4.9 Private sanitary facilities with one water closet and one lavatory and medicine cabinet.
4.1.4.10 All plumbing facilities and sewers required. Protect from freezing.

4.1.5 Minimum Furnishings

4.1.5.1 Two 5-drawer desks.
4.1.5.2 Two swivel desk chairs.
4.1.5.3 Three side chairs.
4.1.5.4 One drafting table with built-in drawer, drafting stool and light.
4.1.5.5 One plan rack to hold eight racks of drawings.
4.1.5.6 Two 4-drawer legal file cabinets.
4.1.5.7 One 2-door storage cabinet.
4.1.5.8 Book shelving and bookcase.
4.1.5.9 Two waste baskets.
4.1.5.10 One tack board 30 inches by 36 inches.
4.1.5.11 Fire extinguishers.
4.1.5.12 Identifying exterior sign acceptable to Contracting Officer.
4.1.5.13 First aid kit.
4.1.5.14 Outdoor thermometer mounted in shade but visible for easy reading from inside office.
4.1.5.15 Electric clock.

4.1.6 Maintenance

4.1.6.1 Continuous maintenance of office and services; cleaned not less than once per week.

4.1.6.2 Provide soap, paper towels, cleansers, janitorial service and implements.

4.1.6.3 Immediately repair any damage, leaks or defective service.

5. Contractor's FIELD OFFICE:

5.1 Provide a Contractor's field office with the minimum facilities specified.

5.1.1 Field Office and Furnishings:

5.1.1.1 As required by Contractor, but with sufficient room for Project meetings.
5.1.1.2 Include conference table and chairs sufficient for ten persons.
5.1.1.3 Telephone service.
5.1.1.4 Light and temperature as specified under Contracting Officer's Field Office.
5.1.1.5 Six protective helmets for visitors' use.
5.1.1.6 Exterior identifying sign.
5.1.1.7 Other furnishings at Contractor's option.

5.1.2 Provide one set of all Contract Documents in the office for ready reference at any time by interested parties.

6. EMERGENCY MEDICAL FACILITY:

6.1 The emergency medical facility shall consist of a minimum of 96 square feet of floor space. The facility shall contain, as a minimum, the following equipment and supplies:

6.1.1 Two stretchers;
6.1.2 One set of crutches;
6.1.3 Two Self-Contained Air Breathing Apparatuses (SCBA);
6.1.4 One cot;
6.1.5 Three blankets;
6.1.6 First aid medications appropriate for the initial treatment of burns, abrasions, fractures, and ingestion or dermal contact with on-site hazardous waste; and
6.1.7 Telephone numbers for physicians, hospitals, and ambulance services posted by each telephone at the Project site.

6.2 The Contractor shall have at least one person thoroughly trained in first aid procedures, as specified in SECTION 01460: HEALTH AND SAFETY PROCEDURES, present on the site whenever work is in progress. This person shall be certified in multi-media first aid and CPR by the American Red

Cross or equivalent and must have a certificate indicating that he has completed a first aid training course conducted by the American Red Cross or other approved agency.

7. PERSONNEL HYGIENE AND DECONTAMINATION FACILITIES:

7.1 The Contractor shall provide the equipment and fixtures specified in SECTION 01460: HEALTH AND SAFETY PROCEDURES in order to provide for the proper hygiene and decontamination of all on-site personnel.

8. ACCESS ROADS AND PARKING AREAS:

8.1 Contractor shall provide all temporary construction roads, haul road, walks and parking areas required during the construction and for use of emergency vehicles. Temporary roads, tracking pad and parking areas shall be designed and maintained by the Contractor so as to be fully usable in all weather conditions.

8.2 Locate temporary roads and parking areas as approved by the Contracting Officer.

8.3 Contractor shall prevent interference with traffic on existing roads. The Contractor accepts full responsibility for expenses caused by Contractor's operations over these roads.

8.4 Roadways damaged by Contractor shall be restored to their original condition by the Contractor subject to approval of the Contracting Officer.

8.5 Temporary roads, tracking pod, haul road, walks and parking areas shall be removed by the Contractor prior to final acceptance and the ground returned to its original condition, unless otherwise required by the Contract Documents.

9. SECURITY:

9.1 Contractor shall safely guard all Work, materials, equipment and property within the limits of this Contract from loss, theft, damage and vandalism. Contractor's duty to safely guard property shall include other private property on the site from injury or loss in connection with the performance of the Contract.

9.2 Contractor shall make no claim against any other party to the Contract for damage resulting from trespass.

9.3 Party responsible for security shall make good all damage to property arising from failure to provide adequate security.

9.4 If existing fencing or barriers are breached or removed for purposes of construction, the Contractor shall provide and maintain temporary security fencing equal to the existing in a manner satisfactory

to the Contracting Officer.

9.5 Maintain security program throughout construction until final acceptance precludes need for Contractor's security program.

9.6 The Contractor shall prepare a Security Plan for review and approval by the Contracting Officer. The plan shall be submitted a minimum of one week prior to the Pre-Work Conference.

9.7 The Contractor shall provide security as required for the temporary site access gate throughout the duration of the project.

10. FIRE PROTECTION:

10.1 Basic Requirements.

10.1.1 Contractor shall conform to fire protection and prevention requirements specified herein as well as those which may be established by Federal, State or local governmental agencies.

10.1.2 Contractor shall comply with all applicable provisions of NFPA Standard No. 241, Safeguarding Building Construction and Demolition Operations.

10.1.3 Facilities specified herein shall be provided by the Contractor.

10.1.4 Contractor shall pay all costs, including installation, maintenance and removal.

10.2 Required Fire Fighting Equipment.

10.2.1 Provide portable fire extinguishers, rated not less than 2A - 5B:C in accordance with NFPA Standard No. 10, Portable Fire Extinguishers, for each temporary building.

10.2.2 For every major piece of operating construction equipment provide extinguishers rated not less than 10B:C, suitably mounted for safe storage and easy access.

10.3 Fire Prevention and Safety Measures.

10.3.1 Prohibit smoking in hazardous areas. Post suitable warning signs in areas which are continuously or intermittently hazardous.

10.3.2 Use metal safety containers for storage and handling of flammable and combustible liquids.

10.3.3 Do not store flammable or combustible liquids in or near stairways or exits.

10.3.4 Maintain clear exits from all points in the Work area.

11. PROTECTION OF THE WORK AND PROPERTY:

11.1 Basic Requirements. Contractor shall be responsible for taking precautions, providing programs, and taking all actions necessary to protect the Work and public and private property from damage as specified in this SECTION.

11.2. In order to prevent damage, injury or loss, Contractor's actions shall include, but not be limited to, the following:

11.3 Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with progress of the Work or any utility service company.

11.4 Provide suitable storage for materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.

11.5 Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.

11.6 Frequently clean up refuse, rubbish, scrap materials, and debris caused by construction operations, to the end that at all times the site of the Work shall present a safe, orderly appearance.

11.7 Provide barricades and guard rails around excavations and other hazardous areas.

11.8 Contractor shall not, except after written consent from proper parties, enter or occupy with men, tools, materials or equipment, privately-owned land except on easements provided herein.

11.9 Contractor shall assume full responsibility for the preservation of public and private property on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in execution of the Work by the Contractor, it shall be restored by the Contractor, at his expense, to a condition equal to that existing before the damage was done.

11.10 Barricades and Warning Signals: Where work is performed on or adjacent to any roadway, right-of-way, or public place, Contractor shall furnish and erect barricades, fences, lights, warning signs, and danger signals; shall provide watchmen; and shall take other precautionary measures for the protection of persons or property and protection of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, Contractor shall furnish and maintain at least one light at each barricade. Sufficient barricades shall be erected to keep vehicles from being driven on or into Work under construction. Contractor shall furnish watchmen in sufficient numbers to protect the Work. Contractor's responsibility for maintenance of barricades, signs, lights, and for providing watchmen shall continue until the Project is accepted by the Owner.

12. STORM WATER DRAINAGE SYSTEM:

12.1 Contractor shall provide a sedimentation basin, swales, and any other equipment required to contain treat and discharge storm water in compliance with state, federal and local ordinances.

12.2 Contractor shall maintain system and pay all operating expenses, sampling, analytical testing and reporting costs.

13. REMOVAL OF TEMPORARY FACILITIES: Prior to final inspection, remove sanitary conveniences, project signs and other temporary facilities. Remove or restore, as required, temporary roads, and parking areas. Refer to SECTION 01710: FINAL SITE CLEANUP for additional requirements.

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SECTION 01545

PROTECTION OF THE WORK AND PROPERTY

1. GENERAL

1.1 Protection of the work and property shall conform to the requirements of the Contract Documents or as directed in this SECTION.

1.2 Contractor shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the Work and all public and private property and facilities from damage as specified herein.

1.3 In order to prevent damage, injury or loss, Contractor's actions shall include, but not be limited to, the following:

1.3.1 Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the Work or the Work of any other contractor or utility service company.

1.3.2 Provide suitable storage facilities for all materials which are subject to injury by exposure to weather, theft, breakage, or otherwise.

1.3.3 Place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work.

1.3.4 At least daily clean up all refuse, rubbish, scrap materials, and debris caused by his operations, to the end that at all times the site of the Work shall present a safe, orderly and workmanlike appearance.

1.3.5 Provide barricades and guard rails around openings, around excavations, and other hazardous areas.

1.4 Contractor shall not, except after written consent from proper parties, enter or occupy with men, tools, materials or equipment, privately-owned land except on easements provided herein.

1.5 Contractor shall assume full responsibility for the preservation of all public and private property or facility on or adjacent to the site. If any direct or indirect damage is done by or on account of any act, omission, neglect or misconduct in the execution of the Work by the Contractor, it shall be restored by the Contractor, at his expense, to a condition equal to that existing before the damage was done.

2. BARRICADES AND WARNING SIGNALS

2.1 Where Work is performed on or adjacent to any roadway, right-of-way, or public place, Contractor shall furnish and erect barricades, fences, lights, warning signs, and danger signals, shall provide watchmen, and shall take other precautionary measures for the protection of persons or property and of the Work. Barricades shall be painted to be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain at least one light at each barricade which shall be erected to keep vehicles from being driven on or into Work under construction. The Contractor's responsibility for the maintenance of barricades, signs and lights, shall continue until the Project is accepted by the Contracting Officer.

3. PROTECTION OF EXISTING STRUCTURES

3.1 Underground Structures:

3.1.1 Underground structures are defined to include, but not be limited to, all sewer, water, gas, and other piping, and manholes, chambers, electrical conduits, tunnels and other existing subsurface work located within or adjacent to the Contract limits.

3.1.2 All underground structures known to Contracting Officer except water, sewer, electric, and telephone service connections are shown on the Contract Drawings. This information is shown for the assistance of Contractor in accordance with the best information available, but is not guaranteed to be correct or complete.

3.1.3 Contractor shall explore ahead of his trenching and excavation Work and shall uncover all obstructing underground structures sufficiently to determine their location, to prevent damage to them and to prevent interruption to the services which such structures provide. If Contractor damages an underground structure, he shall restore it to original condition at his expense.

3.1.4 Necessary changes in the location of the Work may be made by Contracting Officer, to avoid unanticipated underground structures.

3.1.5 If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, Contracting Officer will direct Contractor in writing to perform the Work.

3.2 Surface Structures:

3.2.1 Surface structures are defined as all existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundations or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks,

walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

3.3 Protection of Underground and Surface Structures:

3.3.1 Contractor shall sustain in their places and protect from direct or indirect injury all underground and surface structures located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, Contractor shall satisfy the Contracting Officer that the methods and procedures to be used have been approved by the party owning same.

3.3.2 Contractor shall assume all risks attending the presence or proximity of all underground and surface structures within or adjacent to the limits to the Work. Contractor shall be responsible for all damage and expense for direct or indirect injury caused by his Work to any structure. Contractor shall repair immediately all damage caused by his work, to the satisfaction of the owner of the damaged structure.

3.4 All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers, and curbs which are temporarily removed to facilitate installation of the Work shall be replaced and restored to their original condition at Contractor's expense.

4. PROTECTION OF INSTALLED PRODUCTS AND LANDSCAPING

4.1 Provide protection of installed products to prevent damage from subsequent operations. Remove protection facilities when no longer needed, prior to completion of Work.

4.2 Control traffic to prevent damage to equipment, materials and surfaces.

4.3 Prohibit traffic of any kind across planted lawn and landscaped areas.

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SECTION 01560

TEMPORARY CONTROLS

1. GENERAL

1.1 Temporary controls shall conform to the requirements and as described in this SECTION.

1.2 Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and adjacent areas. Remove physical evidence of temporary facilities at completion of Work.

1.3 Related Sections:

1.3.1 SECTION 01430: ENVIRONMENTAL PROTECTION

2. NOISE CONTROL

2.1 Contractor's vehicles and equipment shall be such as to minimize noise to the greatest degree practicable. Noise levels shall conform to the latest OSHA standards and in no case will noise levels be permitted which interfere with the work of the PAFB or others.

3. PEST AND RODENT CONTROL

3.1 Provide rodent and pest control as necessary to prevent infestation of construction or storage area. Contractor shall note that evidence or rodents has been observed along perimeter of landfill.

3.1.1 Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

4. WATER CONTROL

4.1 Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and in conformance with all environmental requirements.

4.2 Construct temporary drainage systems as indicated on the Contract Drawings.

5. POLLUTION CONTROL

5.1 Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

5.2 Provide equipment and personnel required to perform emergency measures to contain any spillages, and to remove contaminated soils or liquids.

5.2.1 Excavate and dispose of any contaminated earth offsite, and replace with suitable compacted fill and topsoil.

5.3 Take special measures to prevent harmful substances from entering public waters.

5.3.1 Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

5.4 Provide systems for control of atmospheric pollutants.

5.4.1 Prevent toxic concentrations of chemicals.

5.4.2 Prevent harmful dispersal of pollutants and odors into the atmosphere.

5.5 All Contractor's equipment used during construction shall conform to all current federal, state and local laws and regulations.

6. EROSION CONTROL

6.1 Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, to prevent erosion and sedimentation. Work shall be in accordance with SECTION 02430: STORM DRAINAGE SYSTEM.

6.1.1 Hold the areas of bare soil exposed at one time to a minimum.

6.1.2 Provide temporary control measures, such as berms, dikes, drains, hay bales and surface mulch, as required by the Contracting Officer.

6.2 Place fill selectively so as to eliminate surface silts or clays which will erode.

6.3 Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

6.4 Clean areas affected by sedimentation from eroded areas. The use of silt fences and haybales shall be employed at areas necessary to prevent transport or sediment off-site.

7. DUST CONTROL

7.1 The Contractor shall control fugitive dust in accordance with SECTION 01430: ENVIRONMENTAL PROTECTION.

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SECTION 01593

USE OF PAFB FACILITIES

1.1 GENERAL

1.1.1 Contractor may use existing facilities or equipment in the new Work for construction related purposes only if the PAFB'S written permission is first obtained.

1.1.2 The Contractor shall restore existing facilities and equipment used for temporary purposes to original condition in a manner satisfactory to PAFB.

1.1.3 Refer to SECTION 01500: TEMPORARY CONSTRUCTION FACILITIES for additional information regarding use of PAFB facilities.

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SECTION 01610

TRANSPORTATION AND STORAGE
OF MATERIALS AND EQUIPMENT

1. MAINTENANCE AND PROTECTION OF TRAFFIC:

1.1 Basic Provisions.

1.1.1 All streets and trafficways shall be kept open for the passage of traffic and pedestrians during the construction period unless otherwise approved by the Contracting Officer and local authority having jurisdiction. Contractor shall conform to all PAFB security police requirements regarding movement of equipment, material and contractor personnel and their vehicles when on PAFB property.

1.1.2 Contractor shall give the required advance notice to the ambulance, fire and police departments and local authorities, as required, of his proposed operations affecting local traffic.

1.1.3 Contractor shall give reasonable notice to owners or tenants of private property who may be affected by his operations.

1.1.4 Contractor shall provide signs, signals, barricades, flares, lights and all other equipment, service and personnel required to regulate and protect all traffic and warn of hazards. All such work shall conform to requirements of the state or local authority having jurisdiction. Remove temporary equipment and facilities when no longer required. Restore grounds to original or specified conditions.

1.1.5 Roadways damaged by Contractor shall be restored to their original condition by the Contractor subject to approval of the Contracting Officer.

1.2 Road Use and Maintenance.

1.2.1 Protection of Traveling Public. Contractor shall be responsible for maintaining traffic control in the vicinity of the project. As a minimum, Contractor will provide warning signs and provide flagmen to direct traffic at peak traffic times. At other times, when Contractor's work blocks traffic or otherwise interferes with normal flow of traffic, the Contractor shall furnish flagmen to direct traffic. The Contractor will not cause undue delays of traffic flow without prior approval of the Contracting Officer.

1.2.2 Travel upon the street or upon any intersecting alley or street shall not be hindered or needlessly inconvenienced, except in special cases, as may be allowed by the Contracting Officer. Whenever a street is closed with the permission of the Contracting Officer, the Contractor shall place the specified, properly worded barricades and signs announcing

the fact to the public.

1.2.3 Ditches, inlets and fire hydrants shall not be blocked by the Contractor. If necessary, the Contractor shall construct boxes, temporary drainage or other structures to take care of drainage. The same must be done at Contractor's expense without extra compensation.

1.2.4 Obstructing driveways, etc. Unless accomplishment of the work requires obstructing driveways or other entrances to private property, the Contractor shall not in the prosecution of the Work obstruct any driveway or their entrance to private property.

1.2.5 Cleanliness of Surrounding Streets. The Contractor shall be responsible for keeping streets used by him, his suppliers and his subcontractors in entering or leaving the job area free of excavated material, debris and any foreign material resulting from construction operations. As necessary to maintain roads in their current state of cleanliness, a combination mechanical broom and vacuum shall be used to sweep and clean paved areas both on PAFB property and off base property.

1.3 Traffic Control.

1.3.1 Handling of Traffic During Construction. This project is to be constructed with as little inconvenience as possible to traffic using existing roadways. In general, the Contractor's proposed sequence of operations on any part of the project will be subject to approval of the Contracting Officer.

1.3.1.1 The Contractor shall be responsible for existing traffic signs within the vicinity of the construction area and along the haul route. Any traffic signs that are damaged as a result of construction operation shall be replaced by the Contractor.

1.3.1.2 No direct compensation will be made to the Contractor for work and materials involved in constructing and maintaining barricades, signs and warning devices and lights or for providing any other incidental items necessary for proper direction, safety and convenience of traffic during the period of this Contract. This work shall be considered incidental to the various bid items of the Contract.

1.3.2 Flagman.

1.3.2.1 Provide qualified and suitably equipped flagmen when construction operations affect traffic as required for regulation of traffic and in accordance with the requirements of the authority having jurisdiction.

1.3.2.2 The use of flagmen is for the purpose of assisting in the even flow of traffic and does not in any way relieve the Contractor of full responsibility to taking such other steps and providing such other personnel as he may deem necessary for protection of the Work and public. Furthermore, it does not in any way relieve the Contractor of his responsibility for damage for which he would otherwise be liable.

1.3.3 Traffic Signals and Signs.

1.3.3.1 Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control or affected by Contractor's operations.

1.3.4 Barricades.

1.3.4.1 During the progress of the Work the Contractor must erect and maintain barricades with suitable warning language to warn and protect persons against collision with, falling into or otherwise being injured by or on account of the Work, including but without limitation thereto, ditches or other excavations, and equipment or material placed or stored upon or along the right-or-way or elsewhere in connection with the Work.

1.3.4.2 The Contractor will not only place, erect and maintain any barricade or warning light when he is directed to do so by the Contracting Officer but will also at his own risk determine the necessity for such warnings elsewhere.

1.3.5 Flares and Lights.

1.3.5.1 Between one-half hour before sunset and one-half hour after sunrise there shall also be placed and kept lighted, colored warning lanterns or flares sufficient to protect persons.

1.3.5.2 Provide flares and lights during periods of low visibility:

1.3.5.2.1 To clearly delineate traffic lanes, to guide traffic and to warn of hazardous areas.

1.3.5.2.2 For use by flagmen in directing traffic.

1.3.5.3 Provide illumination of critical traffic and parking areas.

1.4 Access Roads and Parking.

1.4.1 Construction Roads and Temporary Parking.

1.4.1.1 Contractor shall provide temporary construction roads, tracking pad, walks and parking areas required during construction and for use of emergency vehicles. Temporary roads and parking areas shall be designed and maintained by the Contractor so as to be fully suitable in all weather

conditions.

1.4.1.2 Temporary roads, tracking pad and parking shall be limited to the area of work.

1.4.1.3 Monitor parking of all construction and private vehicles:

1.4.1.3.1 Maintain free vehicular access to and through parking areas.

1.4.1.3.2 Prohibit parking on or adjacent to access roads, or in non-designated areas.

1.4.1.4 Temporary roads, walks and parking area shall be removed by the Contractor prior to final acceptance and the ground returned to its original condition, unless otherwise required by the Contract Documents.

1.4.2 Public Roads. The Contractor shall conform to laws and regulations of governing authorities when using public roads. If the Contractor's work requires that public roads be temporarily impeded or closed he shall pay for and obtain approvals of governing authorities before starting any work. He shall coordinate his activities with the Contracting Officer. The Contractor shall prosecute the Work expeditiously and erect and maintain detour roads, bridges or other temporary structures as required by governing authorities and the Contracting Officer.

1.4.3 PAFB Roads. The use of PAFB roadways are governed by PAFB security police. All activities by the Contractor on these roadways shall conform to their requirements.

1.4.4 On-Site Roads. The extent of temporary roads, construction roads, ramps and areas on the site to be accessible for trucking and equipment will be the Contractor's responsibility.

2. HAUL ROUTE:

2.1 Contractor shall meet the following basic requirements:

2.1.1 Consult with PAFB and governing authorities and establish thoroughfares which will be used as haul routes and site access. All haul routes on PAFB are subject first to PAFB review and approval; hauling shall not proceed without PAFB approval of haul routes on PAFB property.

2.1.2 Confine construction traffic to designated haul routes.

2.1.3 Provide traffic control at critical areas of haul routes to expedite traffic flow and to minimize interference with normal public traffic.

2.1.4 Provide a guard at the temporary gate during work hours to control and restric traffic to the hauled vehicles and those vehicles

granted access by PAFB.

3. TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT:

3.1 General.

3.1.1 Contractor shall make all arrangements for transportation, delivery and handling of equipment and materials required for prosecution and completion of the Work.

3.1.2 Shipments of materials to Contractor or subcontractors shall be delivered to the site only during hours to be stipulated during the Pre-Bid Conference. Shipments shall be addressed and consigned to the proper party giving name of Project, street number and city.

3.1.3 If it is necessary to move stored materials and equipment during construction, Contractor shall move materials and equipment without any additional compensation.

3.2 Delivery.

3.2.1 Arrange deliveries of materials and products in accordance with constructions schedules and in ample time to facilitate inspection prior to installation.

3.2.2 Coordinate deliveries to avoid conflict with work and conditions at site and to accommodate the following:

3.2.2.1 Limitations of storage space.

3.2.2.2 Availability of equipment and personnel for handling products.

3.2.3 Do not have materials or products delivered to project site until related Shop Drawings have been approved by the Contracting Officer.

3.2.4 Do not have materials or products delivered to site until required storage facilities have been provided.

3.2.5 Have products delivered to the site in manufacturer's original, unopened, labeled containers. Keep Contracting Officer informed of delivery of all equipment and materials to be incorporated in the Work.

3.2.6 Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

3.2.7 Immediately on delivery, inspect shipment to assure:

3.2.7.1 Product complies with requirements of Contract Documents and reviewed submittals.

3.2.7.2 Quantities are correct.

3.2.7.3 Containers and packages are intact; labels are legible.

3.2.7.4 Products are properly protected and undamaged.

4. PRODUCT HANDLING:

4.1 Provide equipment and personnel necessary to handle products by methods to prevent soiling or damage to products or packaging.

4.2 Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

4.3 Handle products by methods to prevent bending or overstressing.

4.4 Lift heavy components only at designated lifting points.

4.5 Materials and equipment shall at all times be handled in a safe manner and as recommended by manufacturer or supplier so that no damage will occur to them. Do not drop, roll or skid products off delivery vehicles. Hand carry or use suitable materials handling equipment.

5. STORAGE OF MATERIAL:

5.1 General.

5.1.1 Store and protect materials in accordance with manufacturer's recommendations and requirements of Specifications.

5.1.2 Contractor shall make all arrangements and provisions necessary for the storage of materials and equipment. All excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be stored within the site of work so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all utility service company installations in the vicinity of the Work. Materials and equipment shall be kept neatly and compactly stored in locations that will cause a minimum of inconvenience to their contractors, public travel, adjoining owners, tenants and occupants. Arrange storage in a manner to provide easy access for inspection.

5.1.3 Storage of materials will be limited to areas of work.

5.1.4 Materials and equipment which are to be incorporated in the Work

shall be stored to facilitate their inspection and insure preservation of the quality and fitness of the Work, including proper protection against damage by freezing and moisture. They shall be placed in inside storage areas unless otherwise acceptable to the Contracting Officer.

5.1.5 The Contractor shall be fully responsible for loss or damage to stored materials and equipment.

5.1.6 Do not open manufacturers containers until time of installation unless recommended by the manufacturer or otherwise specified.

5.2 Uncovered Storage.

5.2.1 The following types of materials may be stored out-of-doors without cover:

5.2.1.1 Pipe

5.2.1.2 All fill, stone and other bulk materials

5.2.1.3 Similar materials which are not generally damaged by the weather.

5.2.2 Where applicable, store the above materials on wood blocking so there is no contact with the ground.

5.3 Covered Storage

5.3.1 The following types of materials may be stored out-of-doors if covered with material impervious to water and opaque to sunlight:

5.3.1.1 Rough lumber.

5.3.1.2 Filter media.

5.3.1.3 Filer underdrains.

5.3.1.4 Geosynthetics.

5.3.1.5 Polyethylene piping.

5.3.2 Tie down covers with rope and slope to prevent accumulation of water on covers.

5.3.3 Store materials on wood blocking.

5.4 Fully Protected Storage.

5.4.1 Store all products which may be damaged by the weather in trailers which have a floor, a roof, and fully closed walls on all sides.

5.4.2 Provide heated storage space for materials that would be damaged by freezing.

5.5 Maintenance of Storage.

5.5.1 Maintain a periodic system of inspection of stored products on scheduled basis to assure that:

5.5.1.1 State of storage facilities is adequate to provide required conditions.

5.5.1.2 Products exposed to elements are not adversely affected.

5.6 Storage of Geomembrane Materials

5.6.1 Contractor shall store and protect materials in accordance with manufacturer's recommendations and requirements of the Specifications. Additionally, all geomembrane materials shall be stored inside heated area if the site temperature is, or is expected to drop, below 41°F at any time during the storage period or as directed by the liner manufacturer. Contractor shall make his own provisions for heated storage.

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SECTION 01630

SUBSTITUTIONS

1. GENERAL

1.1 Requests for review of a substitution shall conform to the requirements of the Contract Documents and shall contain complete data substantiating compliance of proposed substitution with Contract Documents.

2. CONTRACTOR'S OPTIONS

2.1 For materials or equipment (hereinafter products) specified only by reference standard, select product meeting that standard, by any manufacturer, fabricator, supplier or distributor (hereinafter manufacturer). To the maximum extent possible, provide products of the same generic kind from a single source.

2.2 For products specified by naming several products or manufacturers, select any one of the products or manufacturers named which complies with Specifications.

2.3 For products specified by naming one or more products or manufacturers and stating "or equal", submit a request for a substitution for any product or manufacturer which is not specifically named.

2.4 For products specified by naming only one product or manufacturer and followed by words indicating that no substitution is permitted, there is no option and no substitution will be allowed.

2.5 Where more than one choice is available as a Contractor's option, select product which is compatible with other products already selected or specified.

3. SUBSTITUTIONS

3.1 During a period of 30 days after date of commencement of Contract Time, Contracting Officer will consider written requests from Contractor for substitution of products or manufacturers, and construction methods (if specified).

3.1.1 After end of specified period, requests will be considered only in case of unavailability of product or other conditions beyond control of Contractor.

3.2 Submit 5 copies of request for substitution. Submit separate request for each substitution and include in the request the following:

3.2.1 For products or manufacturers:

3.2.1.1 Product identification, including manufacturer's name and address.

3.2.1.2 Manufacturer's literature with product description, performance and test data, and reference standards.

3.2.1.3 Samples, if appropriate.

3.2.1.4 Name and address of similar projects on which product was used, and date of installation.

3.2.2 For construction methods (if specified):

3.2.2.1 Detailed description of proposed method.

3.2.2.2 Drawings illustrating method.

3.2.3 Such other data as the Contracting Officer may require to establish that the proposed substitution is equal to the product, manufacturer or method specified.

3.3 In making request for substitution, Contractor represents that:

3.3.1 Contractor has investigated proposed substitution, and determined that it is equal to or superior in all respects to the product, manufacturer or method specified.

3.3.2 Contractor will provide the same or better guarantees or warranties for proposed substitution as for product, manufacturer or method specified.

3.3.3 Contractor waives all claims for additional costs or extension of time related to proposed substitution that subsequently may become apparent.

3.4 A proposed substitution will not be accepted if:

3.4.1 Acceptance will require revision of the Contract Documents.

3.4.2 Acceptance will require a change in design concepts or Specifications.

3.4.3 It will delay completion of the Work, or the work of other contractors.

3.4.4 It is indicated or implied on a Shop Drawing and is not accompanied by a formal request for substitution from Contractor.

3.5 If the Contracting Officer determines that a proposed substitute is not equal to that specified, Contractor shall furnish the product, manufacturer or method specified at no additional cost to government.

3.6 Approval of a substitution will not relieve Contractor from:

3.6.1 The requirement for submission of Shop Drawings as set forth in the Contract Documents.

3.6.2 The requirement for testing of the substituted material as set forth the Contract Documents.

3.7

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SECTION 01700

PROJECT CLOSEOUT

1. GENERAL:

1.1 Requirements. Comply with requirements stated in this and other Specifications for administrative procedures in closing out the Work.

1.2 Substantial Completion.

1.2.1 When the Contractor considers the Work substantially complete he shall submit to the Contracting Officer:

1.2.1.1 A written notice that the Work, or designated portion thereof, is substantially complete.

1.2.1.2 A list of items to be completed or corrected.

1.2.2 Within a reasonable time after receipt of such notice, the Contracting Officer will make an inspection to verify the status of completion.

1.2.3 Should the Contracting Officer determine that the Work is not substantially complete:

1.2.3.1 The Contracting Officer will promptly notify the Contractor in writing, giving the reasons therefore.

1.2.3.2 The Contractor shall remedy deficiencies in the Work and send a second written notice of substantial completion to the Contracting Officer.

1.2.3.3 The Contracting Officer will reinspect the Work.

1.2.4 When the Contracting Officer finds that the Work is substantially complete, he will prepare a Certificate of Substantial Completion. The two year maintenance period for establishment of remediation plantings will begin upon issuance of this certificate.

1.3 Final Inspection.

1.3.1 At the end of the two year maintenance period, when the Contractor considers the Work complete, he shall submit written certification that:

1.3.1.1 Contract Documents have been reviewed.

1.3.1.2 Work has been inspected for compliance with Contract Documents.

1.3.1.3 Work has been completed in accordance with the Contract Documents.

1.3.1.4 Work is completed and ready for final inspection.

1.3.2 The Contracting Officer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.

1.3.3 Should the Contracting Officer consider the Work as incomplete or defective:

1.3.3.1 The Contracting Officer will promptly notify the Contractor in writing, listing the incomplete or defective work.

1.3.3.2 The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to the Contracting Officer that the Work is complete.

1.3.3.3 The Contracting Officer will reinspect the Work.

1.3.3.4 When the Contracting Officer finds the Work is acceptable under the Contract Documents, he will request that the Contractor make closeout submittals.

1.4 Contractor's Closeout Submittals.

1.4.1 Evidence of compliance with requirements of governing authorities.

1.4.2 Project Record Documents.

1.4.3 Evidence of payment and release of liens. Submit the following in such form as approved by Contracting Officer.

1.4.3.1 Contractor's affidavit of payment of debts and claims.

1.4.3.2 Contractor's affidavit of release of liens, with:

1.4.3.2.1 Consent of surety for final payment.

1.4.3.2.2 Separate releases or waivers of liens for subcontractors and others with lien rights against property of Contracting Officer with a list of those parties.

1.4.3.3. All submittals shall be duly executed before delivery to Contracting Officer.

1.5 Final Adjustment of Accounts and Application for Payment.

1.5.1 Submit a final statement of accounting to Contracting Officer.

1.5.2 The statement shall reflect all adjustments to the contract sum:

1.5.2.1 Original contract sum.

1.5.2.2 Additions and deductions resulting from:

1.5.2.2.1 Change orders.

1.5.2.2.2 Unit prices.

1.5.2.2.3 Deductions for uncorrected Work.

1.5.2.2.4 Other adjustments.

1.5.2.3 Total contract sum, as adjusted.

1.5.2.4 Previous payments.

1.5.2.5 Sum remaining due.

1.5.3 The Contracting Officer will prepare a final change order reflecting approved adjustments to the contract sum which were not previously made by change orders.

1.5.4 The Contractor shall submit the final application for payment in accordance with procedures and requirements stated in the Contract.

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SECTION 01710

FINAL SITE CLEANUP

1. GENERAL

1.1 Execute cleaning, during progress of the Work, at completion of the Work, and as required.

1.2 Requirements of Regulatory Agencies:

1.2.1 In addition to the requirements herein, maintain the cleanliness of the Work and surrounding premises within the Work limits so as to comply with federal, state, and local fire and safety laws, ordinances, codes and regulations.

1.2.2 Comply with all federal, state and local anti-pollution laws, ordinances, codes and regulations when disposing of waste materials, debris and rubbish.

1.3 Scheduling of Cleaning and Disposal Operations:

1.3.1 So that dust, wash water or other contaminants generated during such operations do not damage or mar painted or finished surfaces.

1.3.2 To prevent accumulation of dust, dirt, debris, rubbish and waste materials on or within the Work or on the premises surrounding the Work.

1.4 Waste Disposal:

1.4.1 Dispose of all waste materials, surplus materials, debris and rubbish off the landfill site.

1.4.2 Do not burn or bury rubbish and waste materials on the landfill site.

1.4.3 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

1.4.4 Do not discharge wastes onto soils, into streams or waterways.

1.5 Cleaning Materials:

1.5.1 Use only cleaning materials recommended by manufacturer of surface to be cleaned.

1.5.2 Use each type of cleaning material on only those surfaces recommended by the cleaning material manufacturer.

1.5.3 Use only materials which will not create hazards to health or property.

1.6 During Construction:

1.6.1 Keep the Work and surrounding premises within work limits free of accumulations of dirt, dust, waste materials, debris and rubbish.

1.6.2 Keep dust generating areas wetted down.

1.6.3 Provide suitable containers for storage of waste materials, debris and rubbish until time of disposal.

1.6.4 Dispose of waste, debris and rubbish off site at legal disposal areas.

1.7 When Project is Completed:

1.7.1 Remove and dispose of all excess or waste materials, debris, rubbish, and temporary facilities from the site, structures and all facilities.

1.7.2 Repair pavement, roads, sod, and all other areas affected by construction operations and restore them to original condition or to minimum condition specified.

1.7.3 Clean all floors, slabs, pavements, and ground surfaces.

1.7.4 Maintain cleaning until acceptance by Contracting Officer.

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SECTION 01720

RECORD DOCUMENTS

1. GENERAL: Contractor shall maintain and provide the Contracting Officer with record documents as specified below, except where requirements are modified in technical specifications.

2. MAINTENANCE OF DOCUMENTS:

2.1 Maintain in Contractor's field office in clean, dry, legible condition complete sets of the following:

2.1.1 Drawings

2.1.2 Specifications

2.1.3 Amendments

2.1.4 Approved Submittals

2.1.5 Photographs

2.1.6 Change Orders

2.1.7 Modifications to Contract Documents

2.1.8 Test records

2.1.9 Survey data

2.1.10 Field Orders

2.1.11 Other documents pertinent to Contractor's Work.

2.2 Provide files and racks for proper storage and easy access. File in accordance with filing format of the Construction Specification Institute (CSI), unless otherwise approved by the Contracting Officer.

2.3 Make documents available at all times for inspection by the Contracting Officer.

2.4 Record documents shall not be used for any other purpose and shall not be removed from the Contractor's office without approval by the Contracting Officer.

3. MARKING SYSTEM: Mark all changes neatly and legibly in red pencil.

4. RECORDING:

4.1 Label each document "PROJECT RECORD" in 2-inch high printed letters.

4.2 Keep record documents current.

4.3 Do not permanently conceal any Work until required information has been recorded.

4.4 Drawings: Legibly mark to record actual construction including:

4.4.1 Depth of excavation in relation to datum.

4.4.2 Field changes of dimensions and details.

4.4.3 Changes made by Change Order or Field Order.

4.4.4 Details not on original Contract Drawings.

4.5 Specifications and Amendments: Legibly mark up each SECTION to record:

4.5.1 Changes made by Change Order or Field Order.

4.5.1 Other matters not originally specified.

5. SUBMITTAL:

5.1 Upon substantial completion of the work, deliver record documents to Contracting Officer. Final payment will not be made until satisfactory record documents are received.

5.2 Accompany submittal with transmittal letter containing:

5.2.1 Date.

5.2.2 Project title and number.

5.2.3 Contractor's name and address.

5.2.4 Title and number of each record document.

5.2.5 Certification that each document as submitted is complete and accurate.

5.2.6 Signature of Contractor, or his authorized representative.

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SPECIFICATIONS FOR
PLATTSBURGH AIR FORCE BASE LANDFILL NO. 23

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Division No. 2
SITE WORK

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Division No. 2
SITE WORK

SECTION 02050

DISMANTLING AND RELOCATION OF OBSTACLE COURSE

1. GENERAL

1.1 Scope of Work

1.1.1 Contractor shall furnish all labor, materials, equipment and incidentals to dismantle (where necessary), remove, salvage and re-establish the existing obstacles on Landfill 023. Twelve (12) obstacles of varying size and shape exist at the site. Approximate locations of these obstacles are shown on the Contract Drawings. Photographs and PAFB sketches showing construction requirements are shown in the Appendices to these Specifications.

1.1.2 Removal of the obstacles from Landfill 023 shall be accomplished prior to starting any excavation or grading on the Landfill. Contractor shall re-establish the obstacles at the locations shown on the Contract Drawings under PAFB direction.

1.2 Related Sections:

1.2.1 SECTION 01460: HEALTH AND SAFETY PROCEDURES

1.2.2 SECTION 01610: TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT

1.2.3 SECTION 02100: CLEARING AND SITE CLEANING

1.3 Submittals

1.3.1 Schedule: The Contractor shall submit for approval proposed methods, equipment, and operating sequences and date (within 48 hours) for removal (dismantling where necessary) and re-establishment of the obstacles.

1.4 Job Conditions

1.4.1 Protection:

1.4.1.1 The Contractor shall perform all dismantling (where necessary) and removal Work to prevent damage or injury to structures and adjacent features which might result from falling debris or other causes, and so as not to interfere with the use, and free and safe passage to and from adjacent structures.

1.4.1.2 Should structures be damaged or broken during dismantling or reassembly operations, they shall be replaced by the Contractor subject to PAFB approval.

1.4.1.3 Closing or obstructing of roadways and passageways adjacent to the Work by the placement or storage of materials will not be permitted, and all operations shall be conducted by the Contractor with a minimum interference to traffic on these ways.

1.4.1.4 The Contractor shall repair damage to any property belonging to PAFB.

1.4.2 Scheduling:

1.4.2.1 The Contractor shall carry out operations so as to avoid interference with PAFB's operations and work.

1.4.3 Notification:

1.4.3.1 At least 48 hours prior to commencement of dismantling (where necessary) or removal, notify PAFB in writing of proposed schedule therefor.

1.4.4 Explosives:

1.4.4.1 Blasting is not permitted.

2. PRODUCTS

2.1 If, in the opinion of the Contracting Officer and PAFB, any obstacle or portion of an obstacle is not suitable for reuse and reinstallation, PAFB will provide new equivalent components which will permit reinstallation of the obstacle. All obstacle components will be subject to Contracting Officer and PAFB inspection.

3. EXECUTION

3.1 The Contractor shall:

3.1.1 Dismantle (where necessary) and remove from the ground all obstacles and their fasteners. Obstacles are to be removed intact from the ground in which they are anchored. Embedded portions shall not be severed and left in place.

3.1.1.1 Should it be determined that embedded portions of obstacle components have become rotted and not suitable for reuse, they shall be replaced subject to Contracting Officer and PAFB approval.

3.1.2 Transport each dismantled (where necessary) obstacle in a manner which will allow for reassembly of the obstacle. Contractor's bid shall be based on dismantling (where necessary), transporting and re-establishing obstacles to the location shown on the Contract Drawings.

3.1.3 Re-establish obstacles using PAFB requirements presented in the Appendices to these Specifications. Re-establishment of obstacles shall be performed under the direct supervision of PAFB personnel and shall be subject to Contracting Officer and PAFB approval.

3.2 CLEAN-UP

3.2.1 Contractor shall remove all obstacles, debris, waste and equipment in a manner sufficient for remaining landfill closure activities to proceed as specified.

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SECTION 02100

CLEARING AND SITE CLEANING

1. GENERAL:

1.1 Scope. Contractor shall furnish all labor, materials, equipment and incidentals required to perform all clearing and site cleaning as shown and specified.

1.2 Related Work specified elsewhere.

1.2.1 SECTION 01430: ENVIRONMENTAL PROTECTION

1.2.2 SECTION 01460: HEALTH AND SAFETY PROCEDURES

1.2.3 SECTION 01710: FINAL SITE CLEANUP

1.2.4 SECTION 02050: DISMANTLING AND RELOCATION OF OBSTACLES

1.2.5 SECTION 02225: EXCAVATION AND BACKFILL

1.2.6 SECTION 02226: FINAL COVER CONSTRUCTION

1.3 The dismantling and relocation of existing obstacles is addressed in SECTION 02050: DISMANTLING AND RELOCATION OF OBSTACLES.

2. PRODUCTS:

2.1 Codes and Standards. State and local laws and code requirements shall govern the hauling and disposal of trees, shrubs, stumps, rubbish, site debris (including metal debris such as metal piping), appliances, and other matter except where directed otherwise in accordance with Subsection 4, DISPOSAL OF MATERIALS.

2.2 Protection.

2.2.1 The Contractor shall protect streets, roads, adjacent property and other works and structures shall be protected throughout the entire project. Contractor shall return to original condition any damaged facilities caused by the Contractor's operations.

2.2.2 The Contractor shall protect trees, shrubs and grassed areas which are to remain by fences, barricades, wrapping or other methods as shown, specified or approved by the Contracting Officer. Equipment, stockpiles, etc., shall not be permitted within tree branch spread. Trees shall not be removed without approval of the Contracting Officer unless shown or specified. For further guidance refer to SECTION 01430: ENVIRONMENTAL PROTECTION.

2.3 Limits. Limits of clearing shall be confined to the area within the project limits except as otherwise shown or directed by the Contracting Officer. Damage outside these limits caused by the Contractor's operations shall be corrected at the Contractor's expense.

2.4 Pruning. The Contractor shall trim trees and shrubs where possible to avoid complete removal or damage. Trimmed or damaged trees shall be treated and repaired by persons with experience in this specialty who are approved by Contracting Officer. Trees and shrubs intended to remain which are damaged beyond repair, or removed, shall be replaced by the Contractor.

2.5 Guarantee. Contractor shall guarantee that Work performed under this SECTION will not permanently damage trees, existing monitoring wells, shrubs, turf or plants designated to remain, or other adjacent work or facilities. If damage resulting from Contractor's operations appears during the period up to 24 months after completion of the project, he shall replace damaged items at no expense to the Government.

3. EXECUTION:

3.1 Cleaning.

3.1.1 The Contractor is advised that a small quantity of construction debris, primarily metal manhole rims, various lengths of 6-inch diameter (approximately) metal piping, automobile tires, one (1) old oil tank (approximately 1000 gallons) and other various debris are currently scattered along the general perimeter of the site. The Contractor shall remove this debris and other debris on the landfill surface, estimated at less than 100 cubic yards, as part of Site Clearing operations.

3.2 Clearing.

3.2.1 The Contractor shall clear the areas within the project limits, consisting of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including stockpiles of previously cleared trees and brush, downed timber, snags, brush, and rubbish. Vegetation in areas to be cleared shall be cut off within 3 inches of ground surface, except such trees and vegetation as may be directed to be left standing. Any trees designated by the Contracting Officer to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches to the heights directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches.

3.3 Grubbing.

3.3.1 Contractor shall grub within the project limits. Grubbing shall consist of the removal of all stumps, roots and buried logs. All top roots, lateral roots or other projections over one and one-half inches in diameter, shall be removed to a depth of two feet below the natural ground surface. Material removed by grubbing, such as tree stumps, shall be cut into sections for disposal.

4. DISPOSAL OF MATERIALS:

4.1 The Contractor shall transport surface vegetation off site for disposal in accordance with all applicable rules and regulations. No cleared material shall be used for backfill or structural embankments, and burning on site is not permitted.

4.2 The Contractor must dispose of all materials in a legal manner. As an alternative to landfilling, the metal debris and any other debris may be sold for recycling purposes (with the exception of manhole rims and covers, which are PAFB property).

4.3 All removal and disposal activities shall be conducted in accordance with all applicable Federal, State and local regulations and the requirements of SECTION 01460: HEALTH AND SAFETY PROCEDURES and the applicable requirements of SECTION 01610: TRANSPORTATION AND HANDLING OF MATERIALS AND EQUIPMENT.

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SECTION 02225

EXCAVATION AND BACKFILL

1. GENERAL.

1.1 Scope of Work. The following activities are required in this SECTION.

1.1.1 Contractor shall provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling and disposing of earth materials as shown, specified, and required for the purpose of constructing structures, grading, and other facilities required to complete the Work in every respect.

1.1.2 The Contractor shall provide all temporary means needed to maintain the site, where required, in a continuously dewatered condition.

1.1.3 The Contractor shall provide all labor, materials, equipment and incidentals to perform all necessary earthwork and grading required to repair displaced and eroded soil materials on subgrade, prepare and place the contour grading material, the gas venting layer, the drainage layer, the barrier protection layer and topsoil layer prior to final acceptance.

1.1.4 The Contractor shall provide all temporary means needed to prevent discharge of sediment to water courses because of dewatering systems or erosion during construction.

1.1.5 No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof.

1.1.6 The Contractor shall perform all necessary grading and fill placement work required for preloading. After preloading, the Contractor shall regrade as required to construct the finished subgrade to within 1-inch of the elevations or general slopes shown. All cover system material shall be raked as necessary to remove existing surface irregularities and stones.

1.1.7 The Contractor shall perform all necessary earthwork and slope stabilization for construction of the final landfill cover as shown on the Contract Drawings.

1.1.8 The Contractor shall perform all necessary earthwork required to load and transport on or off-site soil material; unload, place, compact and grade the general backfill, select fill and topsoil materials.

1.1.9 The Contractor shall perform all necessary earth work and grading to prepare the subgrade for the perimeter drainage swales.

1.1.10 The Contractor shall perform all necessary earth work and grading to prepare the subgrade for the maintenance and access roads, and pavements.

1.1.11 The Contractor shall provide all temporary means to manage and control stormwater discharge and prevent siltation and sedimentation of existing and newly constructed stormwater structures in the Work area during the course of the Work.

1.2 Related SECTIONS:

1.2.1 SECTION 02050: DEMOLITION AND RELOCATION OF OBSTACLE COURSE

1.2.2 SECTION 02100: CLEARING AND SITE CLEANING

1.2.3 SECTION 02226: FINAL COVER CONSTRUCTION

1.2.4 SECTION 02271: RIP RAP

1.2.5 SECTION 02275: GENERAL BACKFILL

1.2.6 SECTION 02276: SELECT FILL

1.2.7 SECTION 02277: CRUSHED ROCK

1.2.8 SECTION 02430: STORM DRAINAGE SYSTEM

1.2.9 SECTION 02431: CULVERT CONSTRUCTION

1.2.10 SECTION 02480: HYDROSEEDING

1.2.11 SECTION 02920: TOPSOIL

1.2.12 SECTION 06300: GEOSYNTHETICS

1.2.13 SECTION 06400: PVC GEOMEMBRANE

1.3 General:

1.3.1 Contractor shall use clean, select and general backfill and top soil from off-site sources subject to the approval of the Contracting Officer. Limited quantities of on-site materials (obtained from drainage system excavation) may be used subject to the approval of the Contracting Officer and as provided by these Specifications.

1.3.1.1 The Contractor is responsible for ensuring that all material placed from on-site and off-site sources conforms to all material specifications detailed herein.

1.3.1.2 The Contractor may obtain on-site borrow materials only from areas outside the boundary (limits of waste) of the landfill and only from the excavation of drainage system components (i.e., swales, sedimentation basin). These on-site borrow materials shall be subject to the same requirements as off-site materials.

1.4 Quality Assurance

1.4.1 Tests:

1.4.1.1 The services of a qualified testing laboratory (see SECTION 01411: TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR) shall be engaged by the Contractor (subject to the approval of the Contracting Officer) to make tests and determine acceptability of the fill materials as listed below. Samples of fill materials will be collected and tested by the Contractor prior to and/or following Contractors placement of said Materials as required by the Contracting Officer.

1.4.1.2 Required Tests:

1.4.1.2.1 Testing (where applicable) for general backfill and/or select fill shall be:

1.4.1.2.1.1 ASTM D 1557, Moisture-Density Relations of Soils, using 10 lb (4.54 kg) Rammer and 18-in. (457 mm) Drop.

1.4.1.2.1.2 ASTM D 1556, Density of Soil in Place by the Sand-Cone Method.

1.4.1.2.1.3 ASTM D 2922, Density of Soil and Soil Aggregate and Rock in Place by Nuclear Methods (Shallow Depth).

1.4.1.2.1.4 ASTM D 3017, Water Content of Soil and Rock in Place By Nuclear Methods (Shallow Depth).

1.4.1.2.1.5 ASTM D 4253, Maximum Index Density of Soils using a Vibratory Table.

1.4.1.3 Additional testing requirements and frequency of testing on the various materials is addressed in the related sections.

1.4.2 Permits and Regulations:

1.4.2.1 Contractor shall obtain all necessary permits for work in roads, rights-of-way, etc. He shall also obtain permits as required by local, state and federal agencies for earthwork and discharging water from excavations to rivers and streams.

1.4.2.2 Contractor shall perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.5 Submittals

1.5.1 Excavation Plan: Prior to the start of excavation operations, Contractor shall submit a written plan to demonstrate compliance with OSHA Standard, Title 29, Code of Federal Regulations 1926, Subpart P, Excavations. As a minimum, this plan must include:

1.5.1.1 Name of competent person.

1.5.1.2 Excavation method(s) or protective system(s) selected.

1.5.1.3 Copies of "other tabulated data" or "manufacturer's data" if protective system(s) are designed on the basis of such data.

1.5.2 Test Reports

1.5.2.1 Contractor shall submit copies of the following reports directly to Contracting Officer from the testing service:

1.5.2.1.1 Field density tests.

1.5.2.1.2 Optimum moisture-maximum density curve(s).

1.5.2.2 The laboratory analysis results shall be reviewed and approved by the Contracting Officer before any material is ordered or transported.

1.5.2.3 Contractor shall submit to the Constracting Officer representative bulk samples of all materials specified herein.

1.5.3 Prior to the start of the Work, Contractor shall submit a Stormwater Management Plan to the Contracting Officer for Contracting Officer's approval. The Stormwater Management Plan, at a minimum, will outline the Contractor's method(s) for sequencing the construction of the new stormwater management structures. The Contractor's Plan shall also outline the method(s) for preventing siltation and sedimentation and as necessary, cleaning out sand and silt from the new drainage structures, and for preventing stormwater flow from the Work area off the PAFB LF-023 site.

1.6 Job Conditions

1.6.1 Subsurface Information: Subsurface borings and test pit logs for on and off-site locations are available in the Appendices of this Document.

1.6.1.1 Additional test borings and other exploratory operations may be made by Contractor at no cost to the government and subject to the approval of the Contracting Officer.

1.6.2 Existing Structures: Shown on the Drawings are certain surface structures adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of the Contractor. Contractor shall explore ahead of the required excavation to determine the exact location of all structures. They shall be supported and protected from injury by the Contractor. If they are broken or injured, they shall be restored immediately by the Contractor at his expense.

1.6.3 Existing Utilities: The Contractor shall locate existing underground utilities in the areas of Work. If utilities are to remain in place, the Contractor shall provide adequate means of protection during earthwork operations.

1.6.3.1 Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, the Contractor shall consult the Contracting Officer immediately for directions as to procedure. The Contractor shall cooperate with PAFB and utility companies in keeping respective services and facilities in operation. Utilities damaged by the actions of the Contractor shall be repaired by the Contractor to satisfaction of utility owner.

1.6.3.2 The Contractor shall not interrupt existing utilities serving facilities occupied and used by PAFB or others, except when permitted in writing by Contracting Officer and then only after acceptable temporary utility services have been provided.

1.6.3.3 Use of Explosives. The use of explosives will not be permitted.

1.6.3.4 Protection of Persons and Property:

1.6.3.4.1 The Contractor shall barricade open excavations occurring as part of this Work and post with warning lights. The Contractor shall operate warning lights during hours from dusk to dawn each day and as otherwise required.

1.6.3.4.2 The Contractor shall protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.6.3.5 Dust Control: Contractor shall conduct all of his operations and maintain the area of his activities, including sweeping and sprinkling of roadways and sprinkling of landfill work area, so as to minimize creation and dispersion of dust. Calcium chloride shall be used to control serious or prolonged dust problems, subject to approval of PAFB and Contracting Officer. Refer to SECTION 01430: ENVIRONMENTAL PROTECTION for dust control requirements.

1.7 Permits and Regulations

1.7.1 Contractor shall obtain all necessary permits for obtaining and hauling off-site material, if required.

1.7.2 Contractor shall perform Work in compliance with all applicable requirements of governing authorities having jurisdiction.

2. PRODUCTS

2.1 General Backfill:

2.1.1 Contour Grading Material. Product shall be as specified in SECTION 02275: GENERAL BACKFILL.

2.1.2 Barrier Protection Layer. Product shall be as specified in SECTION 02275: GENERAL BACKFILL.

2.2 Select Fill

2.2.1 Gas Venting Layer Sand. Product shall be as specified in SECTION 02276: SELECT FILL.

2.2.2 Drainage Layer Sand. Product shall be as specified in SECTION 02276: SELECT FILL.

2.2.3 Pipe Backfill. Product shall be as specified in SECTION 02276: SELECT FILL.

2.3 Topsoil. Product shall be as specified in SECTION 02920: TOPSOIL.

2.4 Gas Vent Fill. Product shall be as specified in SECTION 02277: CRUSHED ROCK.

2.5 Pipe Bedding. Product shall be as specified in SECTION 02277: CRUSHED ROCK.

2.6 Cap Toe Drain. Product shall be as specified in SECTION 02277: CRUSHED ROCK.

2.7 Pavement Subbase. Product shall be as specified in SECTION 02277: CRUSHED ROCK.

3. EXECUTION

3.1 Contracting Officer will examine the areas and site conditions where excavating, filling, and grading are to be performed and notify the Contractor of conditions which he may find that are detrimental to the proper and timely completion of the Work. The Contractor shall not

proceed with the Work until the unsatisfactory conditions have been corrected in an acceptable manner.

3.2 Site Preparation

3.2.1 All areas to be occupied by permanent construction or embankments, landfill side slope regrading, drainage swale construction, stormwater sedimentation basin construction, or other regrading and excavation during the course of the Work shall be cleared of all trees, brush, roots, stumps, logs, wood and other materials and debris by the Contractor. Subgrades for fills and embankments shall be cleaned and stripped of vegetation, sod, topsoil and organic matter. All waste materials shall be removed from site and disposed of by Contractor. Burning will not be permitted. The Contractor shall perform all site preparation cleaning and clearing in accordance with SECTION 02100: CLEARING AND SITE CLEANING.

3.2.2 The Contractor shall establish a maximum of 100 by 100 foot grid system for controlling all filling operations and for locating all sample and test points. Grid system shall tie into the site control as shown on the Contract Drawings.

3.3 Test Trenches

3.3.1 The limits of landfilled waste shown on the Contract Drawings are approximate. They were determined based upon limited test pitting performed during field investigations. Prior to commencing with landfill closure and site regrading, the Contractor shall carefully excavate and backfill test trenches normal to and along the limits of landfilled waste as shown on the Contract Drawings in order to more accurately delineate the limits of the landfilled waste. The Contractor shall perform all work required in connection with excavating, stockpiling and backfilling for the test trenches. Contractor shall be aware that test trenching may encroach on the landfill waste; attention is directed to SECTION 01460: HEALTH AND SAFETY PROCEDURES for precautions which may be required.

3.3.2 The Contractor shall be responsible for determining the actual limits of landfill waste as is necessary for performance of the work. He is advised to concentrate his exploratory test trenching to areas along the perimeter where the transition from landfill waste to natural ground is unclear.

3.4 Test Pits

3.4.1 Where ordered by the Contracting Officer, the Contractor shall carefully excavate and backfill test pits to determine subsurface conditions or location of existing facilities. The Contractor shall perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, and backfilling for the test pits. Contractor shall be aware that test pits may be performed in the waste material; attention is

directed to SECTION 01460: HEALTH AND SAFETY PROCEDURES for precautions which may be required.

3.4.2 Test pits made by the Contractor for his own use at his option or as required to determine location and elevation of underground piping shall be included in the Bid Items.

3.4.3 Contractor shall be responsible for determining the exact location of all features shown on the plans as is necessary for Contractor's control of the Work.

3.4.4 Payment for six (6) Contracting Officer or PAFB ordered test pits will be included in the unit or lump sum price bid for the Work on the project.

3.4.5 Test pits ordered by Contracting Officer or PAFB are for the purpose of obtaining information for the Contracting Officer or PAFB.

3.5 Excavation

3.5.1 Contractor shall perform all excavation required to complete the Work as shown and specified. Excavated materials may include domestic solid waste, construction debris, aggregate, earth, sand, clay, gravel, hardpan, boulders not requiring drilling and blasting to remove, decomposed rock, pavements, and all other materials within the excavation limits.

3.5.2 Excavations for structures and pipelines shall be open excavations, shored and braced by the Contractor where necessary to prevent possible injury to personnel and to new and existing structures or pipelines.

3.5.3 Stability of Excavations: The Contractor shall slope sides of excavations to comply with OSHA Standards. The Contractor shall shore and brace where sloping is not possible either because of space restrictions or stability of material excavated.

3.5.3.1 The Contractor shall maintain sides and slopes of excavations in a safe condition until completion of backfilling.

3.5.4 Pipe Trench Preparation:

3.5.4.1 The Contractor shall not open more than 100 feet of trench in advance of pipe laying.

3.5.4.2 The Contractor shall minimize trench width to greatest extent practical but shall conform to the following:

3.5.4.2.1 Sufficient to provide room for installing, jointing and inspecting piping, but in no case wider at top of pipe than pipe barrel OD plus 3 feet.

3.5.4.2.2 Enlargements at pipe joints may be made if required and approved by Contracting Officer.

3.5.4.2.3 Sufficient for sheeting, bracing, sloping, and dewatering.

3.5.4.2.4 Sufficient to allow thorough compaction of backfill adjacent to bottom half of pipe.

3.5.4.2.5 The Contractor shall not use excavating equipment which requires the trench to be excavated to excessive width.

3.5.4 Where the existing material beneath the bedding material is considered unsuitable by the Contracting Officer, Contractor shall remove and replace it with select fill. The additional excavation and backfill material, when ordered in writing by the Contracting Officer, shall be included under this SECTION.

3.5.5 Material Storage: The Contractor shall stockpile excavated materials in approved areas, until required for use as backfill or fill as defined by the Specifications. The Contractor shall place, grade and shape stockpiles for stability and proper drainage.

3.5.5.1 The Contractor shall locate and retain soil materials away from edge of excavations.

3.5.5.2 The Contractor shall dispose of excess soil material and waste materials as specified hereinafter.

3.6 Unauthorized Excavation

3.6.1 All excavation outside the lines and grades shown, and which is not approved by the Contracting Officer, together with the removal and disposal of the associated material shall be at the Contractor's expense. The unauthorized excavation shall be filled and compacted with select fill by the Contractor at his expense.

3.7 Drainage and Dewatering

3.7.1 General:

3.7.1.1 The Contractor shall prevent surface and subsurface water from flowing into excavations and from flooding adjacent areas.

3.7.1.2 The Contractor shall remove water from excavation as fast as it collects and so as to prevent damage to the subgrade. Contractor shall

observe trench for signs of imminent failure such as excessive piping, surface cracking, etc.

3.7.1.3 The Contractor shall maintain water level below the bottom of the excavation to provide a stable surface for construction operations, a stable subgrade for the permanent work, and to prevent damage to the Work during all stages of construction.

3.7.1.4 The Contractor shall provide and maintain pumps, sumps, suction and discharge lines and other dewatering system components necessary to convey water away from excavations.

3.7.1.5 The Contractor shall obtain Contracting Officer's approval before shutting down dewatering system for any reason.

3.7.2 Standby Requirements for Dewatering: The Contractor shall provide standby equipment to provide continuity of dewatering operations.

3.7.3 Disposal of Water Removed by Dewatering System:

3.7.3.1 The Contractor shall dispose of all water removed from the excavation that has not contacted exposed solid waste in such a manner as not to endanger public health, property, or any portion of the Work under construction or completed. Applicable stormwater discharge regulations shall be followed.

3.7.3.2 The Contractor shall dispose of all water that has contacted exposed solid waste by separately collecting and disposing of the leachate as approved by Contracting Officer and in compliance with all local and regional laws and regulations.

3.7.3.3 The Contractor shall dispose of water in such a manner as to cause no inconvenience to the PAFB or others involved in work about the site.

3.7.3.4 The Contractor shall convey water from the construction site in a closed conduit. The Contractor shall not use trench excavations as temporary drainage ditches.

3.7.3.5 The PAFB may allow the Contractor to dispose of liquid from the dewatering of the sedimentation basin on-site as directed by the Contracting Officer. If Contractor disposes of sedimentation basin liquid off-site, Contractor shall obtain all required permits at no additional cost to government.

3.8 Sheeting, Shoring, and Bracing

3.8.1 General:

3.8.1.1 Excavations for structures and pipe lines shall be open excavation, sheeted, shored and braced where necessary to prevent injury to workmen, structures, or pipe lines.

3.8.1.2 The Contractor shall observe all municipal, county, state and federal ordinances, codes, regulations and laws.

3.8.1.3 Used material shall be in good condition, not damaged or excessively pitted. All steel or wood sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary work.

3.8.1.4 All timber used for breast boards (lagging) shall be new or used, meeting the requirements for Douglas Fir Dense Construction grade or Southern Pine No. 2 Dense S3.

3.8.1.5 All steel work for sheeting, shoring, bracing, cofferdams etc., shall be designed in accordance with the provisions of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", of the AISC except that field welding will be permitted.

3.8.1.6 Steel sheet piling shall be manufactured from steel conforming to ASTM A 328. Steel for soldier piles, wales and braces shall be new or used and shall conform to ASTM A 36.

3.8.1.7 The Contractor shall maintain shoring and bracing in excavations regardless of time period excavations will be open. The Contractor shall carry down shoring and bracing as excavation progresses.

3.8.1.8 Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed by the Contractor when work is completed. Such removal shall be made in a manner not injurious to the structure or its appearance or to adjacent Work.

3.8.2 Removal of Sheeting and Bracing:

3.8.2.1 The Contractor shall remove sheeting and bracing from excavation unless otherwise ordered in writing by the Contracting Officer. Removal shall be done so as to not cause injury to the Work. Removal shall be equal on both sides of excavation to ensure no unequal loads on pipe or structure.

3.9 General Backfill

3.9.1 Barrier Protection Layer:

3.9.1.1 All general backfill required for the barrier protection layer which is required to provide the grades or slopes shown and as described herein shall be furnished, placed and compacted by Contractor.

3.9.1.2 The Contractor shall backfill excavations as promptly as Work permits, but not until completion of the following:

3.9.1.2.1 Acceptance by Contracting Officer of construction below finish grade.

3.9.1.2.2 Inspection, testing, approval, and recording of locations of underground utilities.

3.9.1.2.3 Removal of trash and debris.

3.9.1.3 The Contractor shall keep excavation dry during backfilling operations. Backfill around piping shall be brought up evenly on all sides.

3.9.1.4 Unless otherwise specified or directed by Contracting Officer, the Contractor shall place general backfill in horizontal loose lifts not exceeding 12 inches in thickness and shall mix and spread backfill in a manner assuring uniform lift thickness after placing.

3.9.1.5 The water content of fill material shall be controlled by the Contractor prior to and/or during placement within the range necessary to obtain the compaction specified. In general, the moisture content of the general backfill shall be maintained to ensure the proper compaction can be obtained as determined by laboratory tests. Contractor shall perform all necessary work to adjust the water content of the material to within the range necessary to permit the compaction specified. No general backfill material shall be placed when free water is standing on the surface of the area where the fill is to be placed. No compaction of general backfill will be permitted with free water on any portion of the fill to be compacted.

3.9.1.6 No general backfill shall be placed or compacted in a frozen condition or on top of frozen material. Frozen material shall be removed by the Contractor prior to continuing with the Work. General backfill containing organic materials or other unacceptable material shall be removed and replaced by the Contractor with approved fill material at no additional cost to the government.

3.9.1.7 Compaction of general backfill shall be performed with equipment suitable for the type of material placed and which is capable of providing the densities required. Contractor shall select compaction

equipment and submit it and his proposed procedure to the Contracting Officer for approval.

3.9.1.8 The Contractor shall compact general backfill by at least two coverages of all portions of the surface of each lift by compaction equipment. One coverage is defined as the condition obtained when all portions of the surface of the fill material have been subjected to the direct contact of the compactor.

3.9.1.9 The effectiveness of the equipment selected by the Contractor shall be tested at the commencement of compacted general backfill Work by construction of a small section of test fill within the area where general backfill is to be placed. If field tests on this section of fill show that the specified compaction is not obtained, the Contractor shall increase the amount of coverages, decrease the lift thicknesses or obtain a different type of compactor. The size of the test fill shall not be less than 20 ft. x 20 ft. No additional cost to the government shall be incurred.

3.9.1.10 The Contractor shall perform construction operations for the placement of general backfill around structures using the specified procedures, except that within 10 feet of existing underground structures, light compaction equipment shall be used, with the gross weight of the equipment not exceeding 7,000 pounds. The Contractor shall provide equipment that is capable of achieving the required compaction within restricted areas next to structures and around piping. Compaction around structures shall start at the structure and proceed in a direction away from the structure.

3.9.1.11 The density of general backfill used as the barrier protection layer shall be 90 percent of the Modified Proctor maximum dry density obtained in the laboratory in accordance with ASTM D 1557.

3.9.1.12 If the specified densities are not obtained, the Contractor shall perform whatever work is required to provide the required densities. This work shall include complete removal of unacceptable fill areas and replacement and/or recompaction until acceptable densities are provided.

3.9.2 Contour Grading Material

3.9.2.1 All contour grading material required for cover subgrade and pre-loading purposes, where placed as shown on the Contract Drawings and as described herein, shall be general backfill unless otherwise specified. Limited quantities may be available from the Contractor's on-site work activities (i.e., excavation for swales and sedimentation basin).

3.9.2.2 The Contractor shall construct the cover subgrade using contour grading material, which shall be placed and compacted in accordance with these Contract Specifications, to the lines and grades as shown on the Contract Drawings.

3.9.2.3 Upon completion of cover subgrade construction, the Contractor shall place additional contour grading material as preload material, which shall be placed and compacted in accordance with these Contract Specifications, to the lines and grades as shown on the Contract Drawings.

3.9.2.4 The Contractor shall regrade (compact or remove where necessary) the contour grading material, previously placed as cover subgrade or preload fill, to provide a minimum grade of four (4) percent, but no greater than 33 percent (3H:1V), over the entire extent of the landfill as necessary to the lines and grades as shown on the Contract Drawings, as promptly as Work permits, but not until completion of the following:

3.9.2.4.1 Preloading of landfill, as specified in SECTION 02226: FINAL COVER CONSTRUCTION, is completed to the satisfaction of the Contracting Officer.

3.9.2.4.2 Acceptance by Contracting Officer of construction below finish grade.

3.9.2.5 The density of general backfill used as contour grading material and trench backfill shall be 90 percent of either the Modified Proctor maximum dry density or Maximum Index Density obtained in the laboratory in accordance with ASTM D 1557 or ASTM D 4253, respectively.

3.9.2.6 If the specified densities are not obtained, the Contractor shall perform whatever work is required to provide the required densities. This work shall include complete removal of unacceptable fill areas and replacement and/or recompaction until acceptable densities are provided at no additional expense to the government.

3.9.3 The Contractor shall compact general backfill used as trench backfill in layers placed in 12 inch lifts to the grades shown on the Contract Drawings.

3.10 Select Fill

3.10.1 Select fill shall be provided in the following locations:

3.10.1.1 Gas Venting Layer and Drainage Layer.

3.10.1.2 Support below and around piping and pavement.

3.10.1.3 Where shown or directed by Contracting Officer.

3.10.2 Subgrade surface shall be level, dry, firm and subject to Contracting Officer's approval. Select fill shall not be placed if any water is on the surface of area to receive fill. Select fill shall not be placed or compacted in a frozen condition or on top of frozen material. Select fill containing organic materials or other unacceptable material

shall be removed and replaced by the Contractor with approved select fill material at no additional cost to the government.

3.10.3 The Contractor shall place select fill in horizontal loose lifts of 12 inches maximum thickness. It shall be mixed and spread in a manner to assure uniform lift thickness after placing.

3.10.4 The Contractor shall compact each layer of select fill before placement of the next lift.

3.10.5 The Contractor shall not place select fill containing lumps, pockets or concentrations of silt or clay, rubble, debris, wood or other organic matter. Select fill containing unacceptable material shall be removed and disposed of by the Contractor at no additional cost to the government.

3.10.6 The water content of the select fill being compacted shall be above the bulking water content for the material. Contractor shall wet or dry the select fill materials before and/or during placement to achieve water contents needed for required compaction.

3.10.7 Compaction of select fill shall be performed with equipment suitable for the type of fill material being placed. Contractor shall select equipment which is capable of providing the densities required and shall submit the equipment to the Contracting Officer for inspection and approval.

3.10.8 Vibratory rollers or vibratory plate compactors are suitable for compaction of select fill. Each layer of select fill material shall be compacted by at least two complete coverages of all portions of the surface of each lift using approved compaction equipment. One coverage is defined as the condition reached when all portions of the fill lift have been subjected to the direct contact of the compacting surface of the compactor.

3.10.9 The density to be obtained in compacting the select fill shall be 90 percent of Maximum Index Density obtained in the laboratory in accordance with ASTM D 4253. If the field and laboratory tests indicate unsatisfactory compaction, Contractor shall provide the additional compaction necessary to obtain the specified degree of compaction. All additional compaction work shall be performed by the Contractor at no additional cost to the government until the specified compaction is obtained.

3.10.10 Select fill necessary to replace subgrade materials disturbed and softened as a result of the Contractor's operations or to backfill unauthorized excavation shall be provided, placed and compacted at the Contractor's expense.

3.11 Topsoil

3.11.1 The Contractor shall provide six (6) inches of topsoil in the following locations:

3.11.1.1 Final cover system construction.

3.11.1.2 All areas disturbed during construction (i.e., swales) or where shown or directed by the Contracting Officer.

3.11.2 Placement of the topsoil shall be as directed in SECTION: 02920 TOPSOIL.

3.12 Grading

3.12.1 General:

3.12.1.1 The Contractor shall uniformly grade areas within limits of grading under this SECTION, including adjacent transition areas. The Contractor shall smooth subgrade surfaces within specified tolerances where shown, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3.13 Disposal of Excavated Materials

3.13.1 Soil material removed from the excavation which does not conform to the requirements for general backfill or other soil materials to be used in the Work or is in excess of that required for filling purposes shall be stockpiled on-site at a location as directed by Contracting Officer or shall be hauled away from the project site by Contractor and disposed of in compliance with municipal, county, state, federal or other applicable regulations at no additional cost to the government. Excess soil material shall not be stockpiled on Landfill side slopes.

3.13.2 Rubbish, domestic solid waste, and refuse which is removed from excavations (i.e., quantities generated for installation of 12 gas vents, which requires drilling or excavation to a depth of 3 feet into waste material) shall be hauled to the center of the landfill, placed in lifts not exceeding 3 feet in thickness, compacted with a sheepsfoot or other approved equipment and covered with a minimum of 12 inches of on-site soil by the Contractor. Compaction shall be accomplished by no less than 5 complete coverages by the approved equipment. Daily cover shall be placed and graded at the end of the work day to a depth of 12 inches minimum over the relocated or exposed waste. Rubbish, and solid waste shall not be stored in open piles at on-site or off-site locations. The Contractor shall conduct his activities to minimize the total area of exposed waste during excavation and relocation operations. Compaction and cover requirements may be waived based upon Contracting Officer's approval.

4. FIELD QUALITY CONTROL

4.1 General

4.1.1 Contracting Officer shall direct the Contractor's testing laboratory to perform compaction testing for control of Contractor's work and the Contracting Officer shall be provided with the test results. Contracting Officer shall inform Contractor when specified densities have been met. Contracting Officer will use the most current moisture density relations obtained from the testing laboratory, for the particular soil, when conducting field tests. See SECTION 02226: FINAL COVER CONSTRUCTION for compaction testing requirements.

4.1.2 Contracting Officer must inspect and approve subgrades and fill lifts before further construction work is performed thereon. At the direction of the Contracting Officer, the Contractor's testing laboratory will conduct confirmatory tests of subgrades and fill lifts.

4.1.3 The Contracting Officer shall review the test results and will determine the acceptability of all results.

4.1.4 If, based on reports of Contracting Officer, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense to the government.

4.1.5 Contracting Officer will direct the Contractor's testing laboratory to collect samples for field quality control testing. Contractor shall provide sealable 5 gallon pails for sample collection. The Contractor shall cooperate with Contracting Officer in collecting the samples at locations requested and as detailed herein, and as required in SECTION 01342: SAMPLES. Samples collected will be tested to determine suitability for use in construction.

4.1.6 If, based on reports from Contracting Officer, fill materials which have been stockpiled or placed do not conform to the specified gradation, degree of compaction or permeability (where applicable), the Contractor shall remove and replace the materials with suitable materials at no additional cost to the the government.

* * * * * *

SECTION 02226

FINAL COVER CONSTRUCTION

1. GENERAL

1.1 Scope of Work:

1.1.1 Contractor shall furnish all labor, materials, equipment, accessories and services necessary to purchase, excavate, transport, place, compact, and test all natural soil and geosynthetic materials specified for the final cover construction as shown on the Contract Drawings and herein specified. The final cover shall consist of 48 inches of material placed above existing intermediate sand cover, contour grading material, or domestic solid waste. The composite final cover (totaling 48 inches in thickness) will consist of the following material layers from top to bottom:

1.1.1.1 Six (6) inch thick surface layer of uncompacted topsoil to support vegetation.

1.1.1.2 Eighteen (18) inch thick clean compacted general backfill as a barrier protection layer.

1.1.1.3 3.8 oz/syd geotextile filter fabric for drainage layer.

1.1.1.4 Twelve (12) inch thick clean compacted select fill for drainage layer.

1.1.1.5 40 mil polyvinyl chloride (PVC) geomembrane or PVC composite geomembrane.

1.1.1.6 Twelve (12) inch thick clean compacted select fill for gas venting layer.

1.1.1.7 3.8 oz/syd geotextile filter fabric for gas venting layer.

1.1.2 Related Sections:

1.1.2.1 SECTION 02050: DISMANTLING AND RELOCATION OF OBSTACLE COURSE

1.1.2.2 SECTION 02100: CLEARING AND SITE CLEANING

1.1.2.3 SECTION 02225: EXCAVATION AND BACKFILL

1.1.2.4 SECTION 02271: RIP RAP

1.1.2.5 SECTION 02275: GENERAL BACKFILL

1.1.2.6 SECTION 02276: SELECT FILL

1.1.2.7 SECTION 02277: CRUSHED ROCK

1.1.2.8 SECTION 02430: STORM DRAINAGE SYSTEM

1.1.2.9 SECTION 02480: HYDROSEEDING

1.1.2.10 SECTION 02920: TOPSOIL

1.1.2.11 SECTION 06300: GEOSYNTHETICS

1.1.2.12 SECTION 06400: PVC GEOMEMBRANE

1.1.2.13 SECTION 06500: COLD WEATHER INSTALLATION - GEOMEMBRANE

1.1.2.14 SECTION 15351: GAS VENT INSTALLATION

1.1.3 General:

1.1.3.1 Contractor is required to use soil materials from both on and off-site sources as defined by these Specifications (see related sections above) and as approved by the Contracting Officer.

1.2 Quality Assurance

1.2.1 Scope:

1.2.1.1 QA/QC requirements of the Final Cover materials as specified in this SECTION shall take precedence over any other QA/QC requirements when these materials are utilized in the Final Cover Construction, unless specifically stated otherwise in this SECTION or by the Contracting Officer.

1.2.2 Testing Laboratory:

1.2.2.1 The services of a qualified testing laboratory (see SECTION 01411 TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR) shall be engaged by the Contractor to make tests and to provide the Contracting Officer with test results for subsequent determination of the acceptability of the final cover materials. Contractor shall be responsible for scheduling laboratory tests and cooperating with testing requests made by the Contracting Officer so as not to delay completion of the Work.

1.2.3 Required Tests:

1.2.3.1 Geomembrane Tests: QA/QC Product requirements are as specified in SECTION 06400: PVC GEOMEMBRANE.

1.2.3.2 Geotextile Filter Fabric Tests: QA/QC Product requirements are as specified in SECTION 06300: GEOSYNTHETICS.

1.2.3.3 Select Fill Tests:

1.2.3.3.1 The Contractor's testing laboratory will perform a minimum of eight (8) density tests using a nuclear densitometer, sand/cone, or other acceptable method per acre per lift (or 1 test per 605 square yards) of completed select fill.

1.2.3.3.2 The Contractor shall reference and record all field test results and locations to a 50 foot by 50 foot site grid. Addittional testing may be required as determined by the Contracting Officer.

1.2.3.3.3 QA/QC testing for Product shall be as specified in SECTION 02276: SELECT FILL and for Execution as specified SECTION 02225: EXCAVATION AND BACKFILL and this SECTION.

1.2.3.4 General Backfill Tests:

1.2.3.4.1 Contour Grading Material

1.2.3.4.1.1 The Contractor's testing laboratory will perform a minimum of four (4) density tests using a nuclear densitometer, sand/cone, or other acceptable method per acre per lift (or 1 test per 1210 square yards) of completed general backfill.

1.2.3.4.1.2 Contractor will record and reference all field test results and locations into the 100 foot by 100 foot site grid. Additional testing may be required as determined by the Contracting Officer.

1.2.3.4.2 Barrier Protection Layer

1.2.3.4.2.1 The Contractor's testing laboratory will perform a minimum of eight (8) density tests using a nuclear densitometer, sand/cone, or other acceptable method per acre per lift (or 1 test per 605 square yards), assuming two (2) lifts, of completed general backfill.

1.2.3.4.2.2 Contractor will record and reference all field test results and locations into the 50 foot by 50 foot site grid. Additional testing may be required as determined by the Contracting Officer.

1.2.3.4.3 QA/QC testing for Product shall be as specified in SECTION 02275: GENERAL BACKFILL and for Execution as specified in SECTION 02225: EXCAVATION AND BACKFILL and this SECTION.

1.2.3.5 Gas Vent Fill Tests: QA/QC testing for Product shall be as specified in SECTION 02277: CRUSHED ROCK and for Execution as specified in SECTION 15351: GAS VENT INSTALLATION.

1.2.3.6 Top Soil Tests: QA/QC testing for Product and Execution shall be as specified in SECTION 02480: HYDROSEEDING and SECTION 02920: TOP SOIL.

1.2.3.7 Friction Angle Tests:

1.2.3.7.1 Prior to furnishing the individual cover system materials, the Contractor's testing laboratory will perform direct shear testing on the approved 3.8 oz/syd geotextile filter fabric, 40 mil PVC composite geomembrane, gas venting and drainage layers, and barrier protection layer. These tests are intended to verify the shear strength of the layered system for side slope stability of all portions of the landfill with slopes steeper than 8% (12.5 Horizontal:1 Vertical). The minimum peak interface friction angle between layers shall be as follows:

1.2.3.7.1.1 28 degrees between compacted barrier protection layer (general backfill) and the 3.8 oz/syd geotextile filter fabric.

1.2.3.7.1.2 28 degrees between the 3.8 oz/syd geotextile filter fabric and the compacted drainage layer (1 x 10^{-2} cm/s select fill).

1.2.3.7.1.3 28 degrees between compacted drainage layer (1 x 10^{-2} cm/s select fill) and 40 mil PVC composite geomembrane. The upper bonded geotextile shall be peeled back to the edges of the shear box while the PVC geomembrane and lower bonded geotextile are attached to the lower shear box. The upper shear box shall contain compacted drainage layer (1 x 10^{-2} cm/s select fill), and the lower box, compacted gas venting layer (select fill).

1.2.3.7.1.4 28 degrees between the 40 mil PVC composite geomembrane and compacted gas venting layer (select fill. The upper bonded geotextile and PVC geomembrane shall be attached to the upper shear box while lower bonded geotextile is peeled back to the edges of the shear box. The lower shear box shall contain the compacted gas venting layer (select fill), and the upper box, compacted drainage layer (1 x 10^{-2} cm/s select fill).

1.2.3.7.2 The friction angle testing outlined above shall be conducted using ASTM D 3080 modified to be in general accordance with the following requirements and is intended to indicate the performance of the various components by attempting to model the field conditions:

1.2.3.7.2.1 The shear box shall be a minimum of 12 inches square in plan dimension.

1.2.3.7.2.2 Each half of the shear box shall be a minimum of three inches in depth.

1.2.3.7.2.3 The soil layers shall be compacted to the specified field densities, based on moisture/density relations determined through laboratory testing necessary to obtain the specified permeabilities.

1.2.3.7.2.4 The 3.8 oz/syd geotextiles shall be tested in the same sequence as shown on the Contract Drawings. The interface geotextile in question shall be connected to the respective upper or lower shear box frame.

1.2.3.7.2.5 The test shall be performed for a minimum of three normal stresses (1, 3, and 5 psi) applied to the geosynthetic to bracket the normal stresses defined above, as required to define the failure plane friction angle. The peak and residual shear stresses shall be recorded and plotted against the normal compressive stresses used. A best fit straight line shall be constructed for each test series.

1.2.3.7.2.6 All samples shall be normally consolidated under the applied load.

1.2.3.7.2.7 The direction of shear for each interface shall be in the direction of manufacture (machine direction) for each geosynthetic sample.

1.2.3.7.2.8 Apply the shear force using a constant rate of displacement not to exceed 0.04 in/min.

1.2.3.7.2.9 All tests shall be continued until a constant shearing force is recorded.

1.2.3.7.2.10 All tests shall be conducted with the soil and geosynthetics in a wet condition, by saturating the specimen in water for 24 hours prior to testing. Samples shall remain saturated during the test.

1.2.3.7.2.11 Contractor shall collect, package and deliver samples to his testing lab as directed by Contracting Officer and specified under SECTION 01411: TESTING LABORATORY SERVICES FURNISHED BY CONTRACTOR.

1.2.3.7.3 If the results of the friction angle testing by the Contractor's testing laboratory do not meet the necessary requirements, the Contractor shall change materials and retest at no additional cost to the government.

1.2.3.7.4 If the results of the PVC composite geomembrane friction angle testing indicate shear failure along the bonded geotextile/PVC geomembrane interface, the composite will be rendered unacceptable. The Contractor shall redo the test with a more suitable composite sample at no additional cost to the government.

1.3 Permits and Regulations

1.3.1 Contractor shall obtain all necessary permits for obtaining and hauling off-site material if required.

1.3.2 Contractor shall perform Work in compliance with applicable requirements of governing authorities having jurisdiction.

1.4 Submittals

1.4.1 Test Reports:

1.4.1.1 Contractor shall submit test reports in accordance with the applicable SECTIONS. Contractor shall make one copy of the following test data available to the Contracting Officer directly from the laboratory.

1.4.1.1.1 Field density tests.

1.4.1.1.2 Optimum moisture-maximum density curve(s) (where applicable).

1.4.1.1.3 Friction angle tests as specified above.

1.4.2 Samples:

1.4.2.1 Representative samples shall be submitted in accordance with the applicable SECTIONS.

2. PRODUCTS

2.1 General Backfill.

2.1.1 Contour Grading Material and Barrier Protection Layer shall be as specified for Product in SECTION 02275: GENERAL BACKFILL.

2.2 Select Fill.

2.2.1 Gas Venting Layer and Drainage Layer shall be as specified for Product in SECTION 02276: SELECT FILL.

2.3 Top Soil.

2.3.1 The top soil shall be as specified for Product in SECTION 02920: TOP SOIL.

2.4 PVC Geomembrane.

2.4.1 The 40 mil PVC geomembrane and PVC composite geomembrane shall be as specified for Product and Execution in SECTION 06400: PVC GEOMEMBRANE and SECTION 06450: PVC COMPOSITE GEOMEMBRANE respectively.

2.5 Geosynthetics.

2.5.1 The geotextile filter fabrics and erosion control blanket shall be as specified for Product and Execution in SECTION 06300: GEOSYNTHETICS.

3. EXECUTION

3.1 General

3.1.1 Excavation/Fill Placement:

3.1.1.1 The Contractor shall perform all excavations and placement of fill to the required lines, grades, depths and dimensions as shown on the Contract Drawings.

3.1.1.2 In any case where the excavation extends deeper than the required elevations, the over-excavated areas shall, at the discretion of Contracting Officer, be filled with select fill and compacted by the Contractor, at no additional cost to the government.

3.1.2 Moisture Control:

3.1.2.1 The Contractor shall not place or compact fill material during or immediately following rainfall. The Contractor shall construct the final cover in such a manner that a minimum of rain water will be retained thereon.

3.1.2.2 No fill material shall be placed when free water is standing on the area to be covered. No compaction of material will be permitted with free water on any portion of the final cover to be compacted.

3.1.3 Compaction:

3.1.3.1 Contractor shall select equipment which is capable of providing the minimum densities required by these specifications and shall submit a description of the type of equipment he proposes to use to the Contracting Officer for approval. Lift thickness, water content (of the material), compactor weight and the number of passes of the compacting equipment will be adjusted as required to obtain the minimum specified density.

3.1.3.2 The Contractor shall compact each soil lift and/or layer of the final cover as specified in SECTION 02225: EXCAVATION AND BACKFILL, and in this SECTION. Contracting Officer will inform Contractor when compaction meets the specifications.

3.1.3.3 If the field or laboratory test results indicate unsatisfactory compaction, Contractor shall provide the additional compactive effort necessary to achieve the desired degree of compaction. All additional compaction work shall be performed by Contractor at no additional cost to the government.

3.1.4 Inspection:

3.1.4.1 Contractor shall examine the areas and conditions under which the work is to be performed and notify Contracting Officer of conditions detrimental to the proper and timely completion of the Work. Contractor shall not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Contracting Officer.

3.2 Installation

3.2.1 Preparation of Landfill Prior to Cover Construction:

3.2.1.1 Existing Landfill Surface:

3.2.1.1.1 The existing landfill surface consists of 1 to approximately 3 feet of soil materials overlying domestic solid waste which was placed previously by the PAFB. On portions of the existing landfill, there exists domestic solid waste and/or construction debris at the surface that shall be removed and disposed of as detailed in SECTION 02225: EXCAVATION AND BACKFILL.

3.2.1.1.2 Contractor shall clear and grub vegetation from the existing landfill surface. The prepared cover subgrade shall be free of rock and gravel, roots, stumps, waste, debris and other deleterious matter. Contractor shall inspect the existing landfill surface prior to starting work and remove any of the above materials on the existing landfill surface.

3.2.1.1.3 The Contractor shall install Settlement Plates (as detailed on the Contract Drawings) on existing landfill surface at a frequency of one (1) per acre and as required by the Contracting Officer.

3.2.1.2 Construction of Cover Subgrade:

3.2.1.2.1 The Contractor shall use contour grading material to construct the cover subgrade to bring the existing landfill surface up to the required minimum grade of four (4) percent and maximum grade of thirty-three (33) percent as shown on the Contract Drawings. The contour grading material shall be placed, graded and compacted in accordance with SECTION 02225: EXCAVATION AND BACKFILL and SECTION 02275: GENERAL BACKFILL, to the lines and grades as shown on the Contract Drawings.

3.2.1.2.2 As the contour grading material is built up for the cover subgrade, settlement plate extension rods shall be added as necessary. Contractor shall provide protection devices (such as steel casing) around each settlement plate riser during construction.

3.2.1.3 Preloading:

3.2.1.3.1 Portions of landfill areas to be covered shall be preloaded by the Contractor to induce Landfill settlement prior to final cover construction. Preloading shall be performed through placement of additional Contour Grading Material above the cover subgrade to the lift heights specified and to the limits shown on the Contract Drawings. Preload fill shall remain in place for a minimum of three (3) months or for a period of time as specified by the Contracting Officer.

3.2.1.3.2 Contour grading material used as preload fill shall be placed, graded and compacted as specified in SECTION 02225: EXCAVATION AND BACKFILL and SECTION 02275: GENERAL BACKFILL.

3.2.1.3.3 Following the placement of contour grading material as preload fill, the Contractor shall provide temporary erosion control by hydroseeding with annual ryegrass as specified in SECTION 02480: HYDROSEEDING over all areas of the project site that have been filled, graded or excavated.

3.2.1.3.3.1 The Contractor shall not hydroseed when the ground is frozen.

3.2.1.3.4 Measurements of settlement plate movement shall be taken by the Contractor at daily intervals for 2 weeks and weekly intervals thereafter, or as specified by the Contracting Officer. Contracting Officer shall designate areas where additional preload material (contour grading material) may be placed, graded and compacted.

3.2.1.3.5 Upon completion of preloading, and at the direction of the Contracting Officer, the Contractor shall resurvey proposed cover areas and place, remove or regrade contour grading material to the limits and elevations required for final cover construction. This may include placement of contour grading material in areas beyond the limits of the preload areas shown on the Contract Drawings.

3.2.1.3.6 Following the resurvey and any regrading of the contour grading material, the Contractor, at the direction of the Contracting Officer, shall cut down and remove settlement plate risers and surrounding

protective devices to a point 3 feet or more below the final grade required of contour grading material. All excavations shall be backfilled and compacted to the surrounding grade.

3.2.1.3.7 The finished grade (after preloading) of the prepared cover subgrade shall have a maximum slope of 33 percent (3H:1V) and a minimum slope of 4 percent (25 H: 1V) prior to placement of the 3.8 oz/syd geotextile filter fabric.

3.2.2 Gas Venting Layer (Select Fill):

3.2.2.1. The Contractor shall place a 3.8 oz./syd geotextile filter fabric layer on top of the prepared subgrade. Refer to SECTION 06300: GEOSYNTHETICS for specifications regarding the geotextile filter fabric.

3.2.2.2. Following the placement of the filter fabric, the Contractor shall place a 12 inch gas venting layer and compact (Refer to SECTION 02225: EXCAVATION AND BACKFILL) as necessary.

3.2.2.3 For placement of the gas vent fill material, PVC Geomembrane, and construction of the gas vents, refer to SECTION 15351: GAS VENT INSTALLATION.

3.2.3 Polyvinyl Chloride (PVC) Geomembrane

3.2.3.1 On side slopes less than 8%, the Contractor shall place on top of the gas venting layer, a 40 mil PVC geomembrane. For side slopes greater than 8%, a 40 mil PVC composite geomembrane shall be placed. Refer to SECTION 06400: PVC GEOMEMBRANE or SECTION 06450: PVC COMPOSITE GEOMEMBRANE for specifications regarding placement.

3.2.4 Drainage Layer (Select Fill):

3.2.4.1 Following completion of the 40 mil PVC geomembrane construction, a 12 inch drainage layer shall be placed and compacted as necessary by the Contractor on top of the 40 mil PVC Geomembrane.

3.2.4.2 The Contractor shall place and maintain a 12 inch minimum lift above the geomembrane, thus prohibiting any contact between construction equipment and the geomembrane. Refer to SECTION 02225: EXCAVATION AND BACKFILL, for specifications regarding placement and compaction.

3.2.4.3 The Contractor shall protect the geomembrane during the placement of materials above the PVC geomembrane by maneuvering all construction equipment in a smooth and controlled manner. The following requirements must be adhered to by the Contractor when placing materials within 24 inches above the PVC geomembrane.

3.2.4.3.1 Limit weight of construction equipment to 8 tons/axle or 1500 lbs/sf of contact ground pressure for tracked equipment.

3.2.4.3.2 Avoid spinning/or locking of treads or wheels.

3.2.4.3.3 Avoid abrupt starts or stops.

3.2.5 Cover System Toe Drain.

3.2.5.1 Following the placement of the PVC geomembrane and during the construction of the drainage layer, the Contractor shall place a toe drain made of 2 inch crushed stone around the perimeter of the landfill as shown on the Contract Drawings. Refer to SECTION 02277: CRUSHED ROCK for 2 inch crushed stone requirements.

3.2.5.2 The Contractor shall place perforated corrugated drain tubes in the cover system toe drain at the locations shown on the Contract Drawings and as specified for Product in SECTION 06600: POLYETHYLENE PIPE.

3.2.6 Barrier Protection Layer (General Backfill):

3.2.6.1 Following placement of the 3.8 oz/syd filter fabric on the drainage layer, 18 inches of general backfill shall be placed by the Contractor and compacted on top of the 3.8 oz/syd filter fabric. Refer to SECTION 02225: EXCAVATION AND BACKFILL, for specifications regarding placement and compaction of the general backfill.

3.2.7 Top Soil Layer:

3.2.7.1 Following the completion of the barrier protection layer, a 6 inch layer of topsoil shall be placed by the Contractor to support vegetative growth. Refer to SECTION 02480: HYDROSEEDING and SECTION 02920: TOPSOIL, for specifications regarding the topsoil layer.

3.2.8 Hydroseeding:

3.2.8.1 Following the completion of the topsoil layer, turf shall be placed by the Contractor. Refer to SECTION 02480: HYDROSEEDING, for specifications regarding landscaping.

3.2.9 Erosion Control Blanket.

3.2.9.1 Following Hydroseeding on slopes steeper than 8% (12.5 Horizontal: 1 Vertical) an erosion control blanket shall be installed by the Contractor as specified in SECTION 06300: GEOSYNTHETICS.

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SECTION 02271

RIP RAP

1. GENERAL:

1.1 Scope. Contractor shall furnish all labor, equipment and materials necessary to place a protective covering of well graded, stone dumped rip rap at culvert inlet and outlets, on the downchutes, and at the toe drain outlets as shown on the Contract Drawings or directed by the Contracting Officer.

1.2 Related Sections:

1.2.1 SECTION 02430: STORM DRAINAGE SYSTEM

1.2.2 SECTION 02431: CULVERT CONSTRUCTION

1.2.3 SECTION 06300: GEOSYNTHETICS

2. PRODUCTS:

2.1 Rip Rap.

2.1.1 Stone used for dumped rip rap shall be hard, durable, angular in shape, resistant to weather and water action, and shall meet the following size distribution requirements:

Size of Stone	Percent of Total Weight Smaller than the Given Size
$3d_{50}$	100
$2d_{50}$	80
$1d_{50}$	50
$0.1d_{50}$	≤10

Note: $2d_{50}$ is equivalent to 2 x d_{50} where d_{50} = 6 inches. d_{50} refers to the 50 percent size.

2.1.2 The length of each stone shall not exceed three times its width or its thickness. Rounded stone or boulders will not be accepted. Broken concrete may be substituted for stone when authorized by the Contracting Officer. Shale and stone with shale seams are not acceptable.

2.1.3 Each load of rip rap shall be reasonably well graded from the smallest to the maximum size specified.

2.1.4 The minimum density of the stone shall be 150 pounds per cubic foot as computed by multiplying the bulk specific gravity saturated - surface - dry basis, determined by ASTM C97-83, by 62.5 pounds per cubic foot or as certified by the approved borrow service.

2.1.5 The gradation of materials furnished for use as dry rip rap will be accepted or rejected based on a visual examination of the material by the Contracting Officer.

3. EXECUTION:

3.1 Dumped Rip Rap

3.1.1 The ground surface on which the rip rap is to be placed, at the thicknesses shown on the Contract Drawings, shall be free of brush, trees, stumps, and other objectionable material and shall be dressed to a smooth compacted surface by the Contractor. All soft or spongy material in areas to receive rip rap shall be removed to a depth of 6-inches as directed by the Contracting Officer and replaced with general backfill and compacted accordance with SECTION 02225: EXCAVATION AND BACKFILL.

3.1.2 The Contractor shall place all rip rap on a 6.0 oz/syd geotextile filter fabric specified in SECTION 06300: GEOSYNTHETICS.

3.1.3 The Contractor shall take care when end-dumping Rip Rap to prevent damage to and insure the integrity of the geotextile filter fabric.

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SECTION 02275

GENERAL BACKFILL

1. GENERAL:

1.1 Scope. Contractor shall furnish all labor, materials, equipment, and incidentals required for furnishing general backfill as contour grading material, barrier protection layer, trench backfill and for perimeter swales as specified and shown on the Contract Drawings.

1.2 Related Sections

1.2.1 SECTION 02225: EXCAVATION AND BACKFILL

1.2.2 SECTION 02226: FINAL COVER CONSTRUCTION

1.2.3 SECTION 02430: STORM DRAINAGE SYSTEMS

1.2.4 SECTION 02431: CULVERT CONSTRUCTION

1.3 Quality Assurance

1.3.1 The services of a qualified testing laboratory (see SECTION 01411: TESTING LABORATORY SERVICES FURNISHED BY THE CONTRACTOR, acceptable to the Contracting Officer, shall be engaged by the Contractor to perform the following tests and determine acceptability of the fill or material as listed below.

1.3.1.1 Contour Grading Material

1.3.1.1.1 Particle Size Distribution, ASTM D422-90. The particle size distribution shall be tested at a rate of one (1) composite sample every 3000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.3.1.1.2 Compaction, ASTM D1557. The maximum dry density and optimum moisture content shall be tested at a rate of one (1) composite sample every 3000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.3.1.2 Barrier Protection Layer

1.3.1.2.1 Particle Size Distribution, ASTM D422-90. The particle size distribution shall be tested at a rate of one (1) composite sample every 2000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.3.1.2.2 Compaction, ASTM D1557. The maximum dry density and optimum moisture content shall be tested at a rate of one (1) composite sample every 2000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.4 Submittals.

1.4.1 The Contractor shall furnish representative samples of the general backfill to the Contracting Officer and shall advise of the source location.

1.4.2 Test Reports.

1.4.2.1 Contractor shall submit test reports in accordance with the applicable SECTIONS. Contractor shall make one copy of the following test results available to the Contracting Officer:

1.4.2.1.1 Particle size distribution.

1.4.2.1.2 Optimum moisture-density curves.

1.5 Certified Clean.

1.5.1 All material to be used as general backfill (obtained from on-site or off-site sources) shall be certified clean.

1.5.3.2 Certified clean is defined as a material which has been tested at a rate of one (1) composite sample every 10,000 cy of material. A composite sample is defined as a sample made up of five (5) grab samples taken randomly throughout the 10,000 cubic yards of material. The samples shall be analyzed for full Toxicity Characteristic Leaching Procedure (TCLP). The general backfill shall be sampled on-site at the above specified frequency. Any general backfill failing TCLP testing shall be removed by the Contractor, as directed by the Contracting Officer, at no expense to the government.

2. PRODUCTS:

2.1 Contour Grading Material:

2.1.1 This material shall meet the following particle size distribution requirements:

Sieve Size	Percent Passing
2 inch	100
No. 40	50
No. 200	≤ 20

2.1.2 The Unified Soil Classification for the contour grading material

shall be one or a combination of the following; GW, GM, SW or SM.

2.1.3 A Coefficient of Curvature (Cc) between 1 and 3.

2.1.4 A Coefficient of Curvature (Cu) greater than 4.

2.2 Barrier Protection Layer:

2.2.1 This material shall meet the following particle size distribution requirements:

Sieve Size	Percent Passing
2 inch	100
No. 40	50
No. 200	15 - 20

2.2.2 The Unified Soil Classification for the contour grading material shall be one or a combination of the following; GM, SW or SM.

2.2.3 A Coefficient of Curvature (Cc) between 1 and 3.

2.2.4 A Coefficient of Curvature (Cu) greater than 4.

2.3 All other uses of general backfill shall meet the requirements of the contour grading material specified above in 2.1.

2.4 The Contractor may obtain general backfill from on-site excavations for drainage systems. A sample of the material shall be submitted by the Contractor for approval regardless of the source. Contracting Officer shall be advised in writing of its source. The Contractor shall obtain the remainder of the material from off-site sources.

3. EXECUTION:

3.1 The Contractor shall place general backfill as contour grading material and barrier protection layer as shown on the Contract Drawings and specified in SECTION 02225: EXCAVATION AND BACKFILL and SECTION 02226: FINAL COVER CONSTRUCTION.

3.2 The Contractor shall place general backfill as trench backfill and for storm drainage structures as shown on the Contract Drawings and as specified in SECTION 02430: STORM DRAINAGE SYSTEM and SECTION 02431: CULVERT CONSTRUCTION.

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SECTION 02276

SELECT FILL

1. GENERAL:

1.1 Scope. Contractor shall furnish all labor, materials, equipment, and incidentals required for furnishing select fill for drainage/gas venting layers and pipe backfill as specified and shown.

1.2 Related Sections

1.2.1 SECTION 02225: EXCAVATION AND BACKFILL

1.2.2 SECTION 02226: FINAL COVER CONSTRUCTION

1.2.3 SECTION 02431: CULVERT CONSTRUCTION

1.3 Quality Assurance

1.3.1 The services of a qualified testing laboratory (see SECTION 01411: TESTING LABORATORY SERVICES FURNISHED BY THE CONTRACTOR) acceptable to the Contracting Officer, shall be engaged by the Contractor to perform the following tests and determine acceptability of the fill or material as listed below.

1.3.1.1 Particle Size Distribution, ASTM D 422-90.

1.3.1.1.1 The particle size distribution shall be tested at a rate of one (1) composite sample every 1000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.3.1.2 Permeability ASTM D 2434.

1.3.1.2.1 The permeability testing of the select fill shall be performed at the maximum density (within 5%) determined from the maximum index density test ASTM 4253 at a rate of (1) composite sample every 3000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.3.1.3 Maximum Index Density ASTM D 4253.

1.3.1.3.1 The maximum index density shall be tested at a rate of one (1) composite sample every 2000 cubic yards. A composite sample is defined as a sample made up of three (3) grab samples taken randomly throughout the approved borrow source.

1.4 Submittals.

1.4.1 The Contractor shall furnish representative samples of the select fill to the Contracting Officer and shall advise of the source location.

1.4.2 Test Reports

1.4.2.1 Particle size distribution

1.4.2.2 Permeability

1.4.2.3 Maximum Index Density

1.5 Certified Clean.

1.5.1 All select fill used for the gas venting, drainage layer and pipe backfill brought on-site shall be certified clean.

1.5.3.2 Certified clean is defined as a material which has been tested at a rate of one (1) composite sample every 10,000 cy of material. A composite sample is defined as a sample made up of five (5) grab samples taken randomly throughout the 10,000 cubic yards of material. The samples shall be analyzed for full Toxicity Characteristic Leaching Procedure (TCLP). The select fill shall be sampled on-site at the above specified frequency. Any select fill failing TCLP testing shall be removed by the Contractor, as directed by the Contracting Officer, at no expense to the government.

2. PRODUCTS:

2.1 Gas Venting Layer:

2.1.1 This material shall have a minimum coefficient of permeability of 1×10^{-3} cm/sec.

2.1.2 This material shall meet the following particle size distribution requirements:

Sieve Size	Percent Passing
3/8 inch	100
No. 200	≤ of 5

2.1.3 The Unified Soil Classification (USC) for this shall be one or a combination of the following; GW, GP, SW or SP.

2.2 Drainage Layer:

2.2.1 For side slopes steeper than 8% (12.5 Horizontal: 1 Vertical) the gas venting layer shall have a minimum coefficient of permeability of

1×10^{-2} cm/sec.

2.2.2 For side slopes less than 8%, the minimum coefficient of permeability shall be 1×10^{-3} cm/sec.

2.2.3 This material shall have the same particle size distribution and USC designation requirements as the gas venting layer (Subsection 2.1).

2.3 Pipe Backfill.

2.3.1 This material shall be run-of-bank gravel, sand or other acceptable granular material, having the following particle size distribution:

Sieve Size	Percent Passing
2 inch	100
#4	25 - 90
#40	5 - 70
#200	0 - 10

3. EXECUTION:

3.1 The Contractor shall place select fill for drainage/gas venting layers as shown on the Contract Drawings and specified in SECTION 02226: FINAL COVER CONSTRUCTION and SECTION 02225: EXCAVATION AND BACKFILL.

3.2 The Contractor shall place select fill as pipe backfill as shown on the Contract Drawings and as specified in SECTION 02431: CULVERT CONSTRUCTION.

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SECTION 02277

CRUSHED ROCK

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish and place crushed rock of the types specified at locations shown and as ordered by the Contracting Officer for purposes of gas vent construction, pavement subbase, pipe bedding and final cover system toe drain.

1.1.2 Related Work Specified Elsewhere:

1.1.2.1 SECTION 02225: EXCAVATION AND BACKFILL.

1.1.2.2 SECTION 02226: FINAL COVER CONSTRUCTION.

1.1.2.3 SECTION 02431: CULVERT CONSTRUCTION

1.1.3.4 SECTION 15351: GAS VENT INSTALLATION.

1.1.3.5 SECTION 15361: GAS MONITORING WELL INSTALLATION

1.1.3 Contractor is required to use approved clean soil materials from off-site sources. All materials used shall be non-calcareous in composition.

1.2 Quality Assurance

1.2.1 Tests:

1.2.1.1 The services of a qualified testing laboratory (see SECTION 01411: TESTING LABORATORY SERVICES FURNISHED BY THE CONTRACTOR) will be engaged by the Contractor to make tests and determine acceptability of the crushed rock materials as listed below.

1.2.2 Required Tests (where applicable):

1.2.2.1 Particle size distribution, ASTM D 422. The particle size distribution for the gas vent fill shall be tested at least once or as directed by the Contracting Officer.

1.2.2.2 Permeability D 2434. The permeability of the gas vent fill shall be performed at the maximum index density (within 5%) determined from the maximum index density test ASTM 4253 at least once or a directed by the Contracting Officer.

1.2.2.3 Maximum Index Density, ASTM D 4253. The maximum index density of the gas vent fill shall be tested at least once.

1.2.3 Reference Standards: Comply with the applicable provisions and recommendations of the following except as otherwise shown or specified:

1.2.3.1 American Society for Testing and Materials (ASTM).

1.2.3.2 Other requirements as specified in NYSDOTSS for Construction Materials, 1990.

1.2.3.2.1 Materials specified herein shall conform to the requirements for "Fine Aggregate" and "Coarse Aggregate", as appropriate, specified in NYSDOTSS-90 except as modified hereunder.

1.2.3.2.2 Materials specified hereunder shall be from sources possessing current NYSDOT certification for the material provided. At Contracting Officer's discretion and subject to his approval, Contractor may, in lieu of certified source, submit certified lab reports of representative samples from the source, demonstrating compliance with the NYSDOTSS-90 for each material from an uncertified source.

1.3 Submittals

1.3.1 Contractor shall furnish representative samples of the crushed rock materials to the Contracting Officer and shall advise of the source location.

1.3.2 Current NYSDOTSS certification letters bearing the date of the most recent certification; or

1.3.3 Certified lab reports demonstrating compliance with applicable provisions of NYSDOTSS and these specifications.

1.3.4 Test Reports:

1.3.4.1 The Contractor shall submit copies of the following reports directly to the Contracting Officer from the testing service:

1.3.4.1.1 Particle size distribution analysis.

1.3.1.1.2 Permeability.

1.3.4.2 The laboratory analytical results shall be approved by the Contracting Officer before any material is ordered.

2. PRODUCTS

2.1 Materials

2.1.1 Gas Vent Fill Gravel Pack:

2.1.1.1 This material shall have the following particle size distribution:

Sieve Size	Percent Passing
1 inch	100
1/4 inch	≤ 5

2.1.1.2 Material shall have a minimum coefficent of permeability of 1 x 10^{-2} centimeters per second (cm/sec).

2.1.2 Cover System Toe Drain (2 inch crush stone):

2.1.2.1 The cover system toe drain shall have the following particle size distribution:

Sieve Size	Percent Passing
2 inch	100
3/4 inch	≤ 5

2.1.3 Pipe Bedding:

2.1.3.1 Pipe bedding shall be made with run-of-crusher stone size desingated TYPE 1 or 2 as specified in the NYSDOTSS.

2.1.4 Pavement Subbase:

2.1.4.1 Pavement Subbase shall be made with run-of-crusher stone size desingated TYPE 1 subbase as specified in the NYSDOTSS.

3. EXECUTION

3.1. Gas Vent Fill:

3.1.1 The Contractor shall place gas vent fill as specified in SECTION 15351: GAS VENT INSTALLATION.

3.2 Pipe Bedding:

3.2.1 The Contractor shall place crushed rock for pipe bedding as shown on the Contract Drawings.

3.3 Toe Drain Fill:

3.3.1 The Contractor shall place crushed rock for the cover system toe drain as specified in SECTION 02226: FINAL COVER CONSTRUCTION and as shown on the Contract Drawings.

3.4 Pavement Subbase:

3.4.1 The Contractor shall place pavement subbase for restoration of paved surfaces as shown on the Contract Drawings.

3.5 Gas Monitoring Well Gravel Pack:

3.5.1 The Contractor shall place gravel pack as specified in SECTION 15361: GAS MONITORING WELL INSTALLATION.

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SECTION 02430

STORM DRAINAGE SYSTEM

1. GENERAL

1.1 Scope: Contractor shall furnish all labor, materials, equipment and incidentals required to clean, excavate, construct, and provide the necessary grading for the construction of perimeter drainage swales and a temporary sedimentation basin with outlet structures.

1.2 General:

1.2.1 The Contractor shall construct the storm drainage system to conform in shape, size, dimensions, materials, and other respects to the details shown or as ordered by the Contracting Officer.

1.2.1.1 Perimeter Swales: The Contractor shall construct the perimeter swales near the side slopes of the final cover using native soils, general backfill (where necessary) and topsoil. The Contractor shall construct and seed the swales as shown on the Contract Drawings. The swales shall have a minimum depth, side slopes and bottom width as specified in the Contract Drawings.

1.2.2 The Contractor shall construct the temporary sedimentation basin and downchutes to conform accurately to the lines, limits and grades as shown on the Contract Drawings.

1.2.3 Inverts shall be as shown and shall conform accurately to the size and elevation of the existing drainage channels.

1.2.4 Related Sections:

1.2.4.1 SECTION 02225: EXCAVATION AND BACKFILL

1.2.4.2 SECTION 02226: FINAL COVER CONSTRUCTION

1.2.4.3 SECTION 02271: RIP RAP

1.2.4.4 SECTION 02275: GENERAL BACKFILL

1.2.4.5 SECTION 02431: CULVERT CONSTRUCTION

1.2.4.6 SECTION 02480: HYDROSEEDING

1.2.4.7 SECTION 02920: TOP SOIL

1.2.4.8 SECTION 06300: GEOSYNTHETICS

1.3 Submittals

1.3.1 Shop Drawings: Shop Drawings showing construction of all diversion and transition structures shall be submitted to the Contracting Officer for approval.

1.4 Reference Standards

1.4.1 New York State Guidelines for Urban Erosion and Sediment Control

2. PRODUCTS

2.1 Fill Materials

2.1.1 All fill utilized in the construction of the drainage swales and temporary sedimentation basin shall meet the requirements of general backfill as specified for Product in SECTION 02275: GENERAL BACKFILL.

2.2 Top Soil. Product shall be as specified in SECTION 02920: TOP SOIL.

2.3 Erosion Control Fabric

2.3.1 Erosion control fabric shall be as specified for Product and Execution in SECTION 06300: GEOSYNTHETICS.

2.4 Silt Fence

2.4.1 Silt Fence shall be as specified for Product and Execution in SECTION 06300: GEOSYNTHETICS.

2.5 Rip Rap

2.5.1 Rip Rap shall be as specified for Product in SECTION 02271: RIP RAP and placed as shown on the Contract Drawings.

2.6 Hay Bale Barrier

2.6.1 Hay bales shall be straw, hay or other acceptable vegetative material.

2.6.2 Stakes shall be 2 inch nominal lumber or number 5 rebars and shall be a minimum of 4 feet long.

3. EXECUTION

3.1 Inspection

3.1.1 Contractor and his geotextile installer shall examine areas and conditions under which the Work is to be performed and advise Contracting Officer in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Contracting Officer.

3.2 Installation

3.2.1 Contractor shall install the drainage swales to the lines and grades shown. Placement of materials shall conform to the related specification requirements.

3.2.2 All transitions into other proposed drainage structures (i.e. Culvert) shall be as smooth as practical with no abrupt changes in grade, alignment or elevation.

3.2.3 Contractor shall construct and maintain temporary erosion control structures and sedimentation basin, as shown and specified, to control siltation and sedimentation. The Contractor shall clean all siltation and sedimentation from the temporary, and permanent stormwater structures constructed under this Contract during and at the conclusion of the Work.

3.2.4 Hay Bale Barriers.

3.2.4.1 The Contractor shall place hay bale barriers in a row with ends tightly abutting the adjacent bale. Each bale shall be embedded in the soil a minimum of 4 inches. All bales shall be securely tied and staked by 2 stakes or rebars driven through each bale minimum of 18 inches into the ground. The first stake shall be driven at an angle toward the previously laid bale to force them together.

3.2.4.2 Hay Bale barriers damaged at any time during or after their installation shall be replaced by the Contractor at no cost to the government for the duration of the excavation.

3.2.5 Temporary erosion control structures installed by the Contractor shall be left in-place until the vegetative growth is fully established or at the direction of the Contracting Officer at which time they shall be cleaned of accumulated silt and debris and removed.

3.2.4 Contractor shall provide temporary soil erosion and sediment control during construction in accordance with the NYS Guidelines for Soil Erosion and Sediment Control, and at the direction of the Contracting Officer.

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SECTION 02431

CULVERT CONSTRUCTION

1. GENERAL

1.1 Scope: Contractor shall furnish all labor, material, tools, equipment and incidentals required to sawcut existing roadway and to furnish, install, and test a 36 inch corrugated metal pipe (CMP) as shown on the Contract Drawings and specified herein.

1.1.2. Included hereunder are all pipe, couplings, bolts, nuts, factory-applied painting, and appurtenances required for installation and testing; and the removal and replacement of pavement.

1.1.4 Related Work Specified Elsewhere:

1.1.4.1 SECTION 02100: CLEARING AND SITE CLEANING.

1.1.4.2 SECTION 02225: EXCAVATION AND BACKFILL.

1.1.4.3 SECTION 02271: RIP RAP.

1.1.4.4 SECTION 02275: GENERAL BACKFILL

1.1.4.5 SECTION 02276: SELECT FILL.

1.1.4.6 SECTION 02277: CRUSHED ROCK

1.1.4.7 SECTION 02430: STORM DRAINAGE SYSTEM

1.2 Quality Assurance

1.2.1 Product Qualifications: CMP shall be the standard product in regular production by the manufacturer whose product has proven reliable in similar service.

1.2.2 Design Criteria:

1.2.2.1 Soil Overburden and Trench Details: As shown on the Contract Drawings.

1.2.2.2 External Loading on Culvert:

1.2.2.2.1 Live Load: AASHTO H-20.

1.2.2.2.2 Dead Load: Earth cover as shown on the Contract Drawings or four feet, whichever is greater, using soil density of 120 lbs/cubic foot.

1.2.3 Reference Standards: Comply with applicable provisions and recommendations of the following:

1.2.3.1 Standards of the American Society for Testing and Materials, ASTM.

1.2.3.2 Standards of the American Iron and Steel Institute, AISI.

1.2.3.3 Standards of the American Association of State Highway and Transportation Officials, ASSHTO.

1.3 Submittals

1.3.1 Shop Drawings: The Contractor shall submit to the Contracting Officer Shop Drawing submittals for the culvert and temporary means of abridging the open trench including the following:

1.3.1.1 Illustrations, specifications and engineering data including: dimensions, material size, weight of the piping.

1.3.1.2 Manufacturer's letter of certification stating the material shipped to the site complies with the specific requirements of this section, and the approved Shop Drawings.

1.3.2 Test Reports

1.3.2.1 The Contractor shall submit to the Contracting Officer the results of the field density tests, as specified under SECTION 02225: EXCAVATION AND BACKFILL, performed in at least two locations (specified by the Contracting Officer) for each material used within the pipe trench.

1.4 Product Delivery, Storage, and Handling

1.4.1 Delivery, storage, and handling of materials shall be in accordance with the manufacturer's instructions. Contractor shall inspect shipments for damage and content well in advance of the date scheduled for incorporation in the Work.

2. PRODUCTS

2.1 Corrugated Metal Pipe:

2.1.1 Pipe shall be furnished in a nominal length and the culvert constructed with a minimum number of couplings.

2.1.2 Pipe shall be free of dents and surface roughness.

2.1.3 All joint surfaces shall be smooth and free of spalls, burrs, cracks, or fractures and all imperfections that would affect the watertightness and performance of the joint.

2.1.4 Pipe: Pipe shall be hot-dipped galvanized and bituminous coated, helically corrugated steel pipe fabricated from steel sheet conforming to ASTM A 569. The 36 inch CMP shall be a minimum 16 gage with 2 2/3" x 1/2" corregations. Seams shall be prepared and welded in accordance with SECTION 13 of AASHTO M-36.

2.1.5 Joints: Joints shall be corrugated connecting coupling bands. The coupling band shall mesh with at least one full corrugation and shall lap equally on each pipe end. The band width shall be a minimum of 10 1/2 iches. The band shall not be more than one nominal sheet thickness thinner than the pipe thickness and in no case thinner than 0.052 inches. The coupling band shall have welded steel angles, by which the bands are connected and tightened with carriage bolts. All field welds shall be coated with zinc rich paint, such as Galvanox, or equal and bituminous coated.

2.1.6 Coatings: All pipe, couplings and hardware shall be hot dip galvanized in accordance with ASTM A 123. Pipe and couplings shall have a bituminous final coating.

2.1.7 Size and Extent: Refer to Contract Drawings.

2.2 Pipe Bedding Materials. Crushed gravel or crushed stone used as bedding for pipe shall be as specified in SECTION 02277: CRUSHED ROCK. The gradation may be modified by the Contracting Officer based on field conditions.

2.3 Pipe Backfill. Select fill used as pipe backfill above the crushed gravel or crushed stone base, adjacent to and for a depth of one (1) foot over the pipe, and elsewhere as directed by the Contracting Officer shall be specified under SECTION 02276: SELECT FILL.

2.4 Seepage Collars. Seepage Collars to be installed around buried CMP as per manufactures recommendations, extending a minimum of two (2) feet away from the outer surface of the CMP. The seepage collars to be installed on minimum 20 foot centers along the CMP.

2.5 Rip Rap. Rip Rap shall be as specified for Product and Execution in SECTION 02271: RIP RAP.

3. EXECUTION

3.1 Inspection

3.1.1 Contractor shall inspect CMP piping to ensure that it is free of defects in material and workmanship. The compatibility of the CMP pipe, couplings, and coatings shall be verified.

3.2 Preparation

3.2.1 Contractor shall also coordinate with PAFB personnel to determine location of utilities in the area of the CMP construction. Utilities, at a minimum, may include gas, telephone, electrical, etc. Contractor shall protect and support utilities as necessary during the CMP installation.

3.2.2 Line and Grade:

3.2.2.1 The Contractor shall lay pipe according to lines and grades shown on the Contract Drawings or as approved by Contracting Officer by sloping pipe uniformly between elevations given.

3.2.2.2 Contractor shall be responsible for maintaining lines and grades.

3.2.3 Trench:

3.2.3.1 The Contractor shall prepare in accordance with SECTION 02225: EXCAVATION AND BACKFILL. Pavement is to be saw cut.

3.2.3.2 The Contractor shall maintain dry trench until installation and backfilling is complete.

3.2.3.3 The Contractor shall excavate around joints in bedding and lay pipe such that only the barrel receives bearing pressure from the trench bottom.

3.2.3.4 Blocking under the CMP will not be permitted unless specifically approved by Contracting Officer.

3.2.3.4 The Contractor shall provide temporary steel plates during periods of open cut so as to not disrupt local traffic.

3.2.4 Pipe:

3.2.4.1 The Contractor shall completely remove and clean all foreign material from pipe interior.

3.2.4.2 The Contractor shall clean pipe joints thoroughly.

3.3 Installation

3.3.1. Laying CMP:

3.3.1.1 Pipe shall be installed only in the presence of the Contracting Officer or a representative designated by the Contracting Officer.

3.3.1.2 The Contractor shall lower pipe into the trench with suitable power equipment.

3.4 Testing of CMP

3.4.1 Testing of all CMP and couplings shall be in accordance with the manufacturer's recommendations.

4. RESTORING AND RESURFACING EXISTING ROADWAYS AND FACILITIES.

4.1 Pavement or roadways disturbed or damaged by Contractor's operations, shall be restored by him at his own expense to the same condition as they were previous to the commencement of the Work and shall be subject to Contracting Officer's approval. Work shall be performed in accordance with applicable local and state highway specifications.

4.2 Paved Roadways.

4.2.1 The Contractor shall place Pavement Subbase to the thickness shown on the Contract Drawings and as specified in SECTION 02777: CRUSHED ROCK.

4.2.2 The Contractor shall place 1-1/2 inches of temporary bituminous pavement immediately after backfilling trenches that traverse paved roadways. The Contractor shall maintain the surface of the paved area over the trench, in good and safe condition during progress of the entire Work, and promptly fill all depressions over and adjacent to the trench caused by settlement of backfill. The permanent replacement pavement shall as shown on the Contract Drawings. All materials and methods shall conform to NYSDOTSS.

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SECTION 02451

GUARD RAILS

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish all labor, materials, equipment and incidentals required to provide and maintain protective guard rails along Old Route 22 above the proposed culvert construction and as shown on the Contract Drawings and specified herein.

1.2 Related Work Specified Elsewhere:

1.2.1 SECTION 02225, EXCAVATION AND BACKFILL.

1.3 Quality Assurance

1.3.1 The Contractor shall provide guard rails as a complete unit produced by a single manufacturer, including necessary erection accessories, fittings and fastenings.

1.3.2 Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1.3.2.1 ASTM A 36, Structural Steel.

1.3.2.2 ASTM A 123, Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strip.

1.3.2.3 AASHTO M 180, Corrugated Sheet Steel Beams for Highway Guard Rail.

1.4 Submittals

1.4.1 Shop Drawings: The Contractor shall submit copies of manufacturer's technical data and installation instructions.

1.5 Product Delivery, Storage and Handling

1.5.1 The Contractor shall protect the guard rails from abuse so as to prevent nicks, gouges and dents.

2. PRODUCTS

2.1 Materials

2.1.1 The guard rails shall be of the galvanized, corrugated sheet steel beam type with galvanized steel posts supporting the rails.

2.1.2 The Contractor shall provide galvanized steel posts of size and shape as recommended by the manufacturer. Steel shall comply with ASTM A 36 and galvanized in accordance with ASTM A 123.

2.1.3 The Contractor shall provide guard rail complying with AASHTO M 180, Class A (12 gage), Type 2.

2.2 Miscellaneous Materials and Accessories

2.2.1 Terminal Sections and Ends: The Contractor shall provide terminal sections and ends as shown. Where not shown, the Contractor shall provide in accordance with the manufacturer's recommendations.

3. EXECUTION

3.1 Installation

3.1.1 The Contractor shall not begin guard rail installation and erection before paving or final grading is completed, unless otherwise acceptable to Contracting Officer.

3.1.2 The Contractor shall drive posts unless otherwise shown or ordered by the Contracting Officer. Accomplish driving with approved equipment and methods that will leave the posts in their final position, free of distortion, burring, or other damage. When posts are driven through bituminous concrete, the Contractor shall take care to prevent damage to the paved areas. The Contractor shall fill, compact and seal depressions and holes, caused by driving the posts, with bituminous concrete similar to that damaged.

3.1.3 When setting posts, the Contractor shall align them to a tolerance of 1/4 inch for plumb and grade.

3.1.4 Rails: The Contractor shall connect rails to posts in accordance with manufacturer's instructions. The Contractor shall install terminal sections or ends.

3.2 Repair

3.2.1 The Contractor shall repair galvanized coating, damaged in the shop or during field erection, by recoating with manufacturer's recommended repair compound, and applying compound in accordance with his instructions.

3.2.2 The Contractor shall repair or replace Section(s) of guard rail damaged during Contractor's field operations.

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SECTION 02480

HYDROSEEDING

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all hydroseeding Work.

1.1.2 The extent of the hydroseeding will cover all areas covered during the final cover construction, drainage swale and sedimentation basin installation, and ancillary work where top soil has been placed.

1.1.3 Coordination:

1.1.3.1 Review installation procedures under other SECTIONS and coordinate the installation of items that must be installed with the hydroseeding.

1.1.4 Related Sections:

1.1.4.1 SECTION 02225: EXCAVATION AND BACKFILL.

1.1.4.2 SECTION 02226: FINAL COVER CONSTRUCTION.

1.1.4.3 SECTION 02920: TOPSOIL

1.2 Quality Assurance

1.2.1 Landscape Subcontractor Qualifications:

1.2.1.1 The Contractor shall subcontract the hydroseeding Work to a single firm specializing in hydroseeding Work.

1.2.1.2 The hydroseeding subcontractor shall have a minimum of five years of experience of performing substantially similar Work.

1.2.2 Source Quality Control:

1.2.2.1 Contracting Officer will request inspection of delivery slips for materials to verify specified quantities of bulk deliveries of soil amendments and fertilizers.

1.2.2.2 Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Analytical Chemists, wherever applicable or as further specified.

1.2.3 Reference Standards: Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.

1.2.3.1 American Society of Testing and Materials, ASTM.

1.2.3.2 Association of Official Analytical Chemists, Official Methods of Analysis.

1.2.3.3 Official Seed Analysis of North America, Standards of Quality.

1.2.3.4 FSO-F-241D, Fertilizer, Mixed, Commercial.

1.2.3.5 FSO-P-166E, Peat Moss; Peat, Humus; and Peat, Reed-sedge.

1.3 Submittals

1.3.1 Shop Drawings: Submit for approval the following:

1.3.1.1 Planting schedule showing scheduled dates for seeding Work.

1.3.1.2 Manufacturer's specifications and installation instructions for all materials required.

1.3.1.3 Certificates from seed vendors certified statement for each seed mixture required, stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

1.3.2 Operation and Maintenance Data: Submit for approval the following:

1.3.2.1 Typewritten instructions recommending procedures to be established by PAFB for the maintenance of landscape Work for one full year. Submit prior to initiation of required maintenance period(s). Include moisture requirements for seed mixture and insect prevention measures including types of spray and application instructions.

1.3.3 Guarantee: Submit for approval a written guarantee, in the terms specified under "Guarantee" provisions of these Specifications, signed by Contractor.

1.4 Product Delivery, Storage and Handling

1.4.1 Delivery of Materials:

1.4.1.1 Deliver packaged materials in original, unopened containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.

1.4.1.2 Furnish seed in sealed, standard containers.

1.4.1.3 Notify Contracting Officer of delivery schedule in advance so materials may be inspected upon arrival at job site.

1.4.2 Storage of Materials:

1.4.2.1 Store and cover materials to prevent deterioration. Remove packaged materials which have become wet or show deterioration or water marks from the site. Replace at no further cost to the government.

1.4.2.2 Seed that is wet or moldy or that has been otherwise damaged in transit or storage is not acceptable. Replace at no further cost to the government.

1.4.2.3 Materials shall be stored in areas designated by Contracting Officer.

1.4.2.4 Chemical treatment materials shall not be stored with other seed materials, but in areas designated by Contracting Officer.

1.4.3 Handling of Materials:

1.4.3.1 Do not dump or drop materials from vehicles, with exception of certain bulk deliveries approved by Contracting Officer.

1.5 Job Conditions

1.5.1 Environmental Requirements:

1.5.1.1 Proceed with and complete the Work as rapidly as portions of the site become available, working within the seasonal limitations for hydroseeding Work required.

1.5.1.2 Do not spread seed when wind velocity exceeds 5 miles per hour.

1.5.1.3 Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.

1.5.2 Scheduling:

1.5.2.1 Plant or install materials only during normal planting seasons for each type of landscape Work required. Correlate planting with specified maintenance periods to provide maintenance until final acceptance by PAFB.

1.6 Alternatives

1.6.1 Do not make substitutions. Substitutions may be allowed by Contracting Officer at the varietal level only. Submit to Contracting Officer proof of non-availability and proposal for use of equivalent material.

1.7 Guarantee

1.7.1 Guarantee hydroseeding through one (1) growing season.

2. PRODUCTS

2.1 Materials

2.1.1 Topsoil Layer:

2.1.1.1 Contractor shall be responsible for coordinating construction schedules with his subcontractor, if he has one, providing the topsoil and to provide the subcontractor with sufficient notice as to when Contractor shall require the topsoil.

2.1.1.2 The topsoil shall be as specified for Product in SECTION 02920: TOPSOIL.

2.2 Soil Amendments:

2.2.1 Lime: Shall be as specified in SECTION 02920: TOPSOIL.

2.2.2 Peat Humus: Shall be as specified in SECTION 02920: TOPSOIL.

2.2.3 Sand: Washed of fine to medium texture.

2.2.4 Ferrous Sulfate: Commercial grade and unadulterated.

2.3 Hydroseeding Fertilizer for grass areas:

2.3.1 Commercial designation of 18-24-6. Provide a complete fertilizer of neutral character with a minimum of 75 percent nitrogen derived from natural organic sources.

2.3.2 Minimum 40-50 percent of nitrogen shall be water soluble.

2.3.3 Uniform in composition, free-flowing and suitable for application with approved equipment.

2.4 Grass Materials:

2.4.1 Grass Mixtures: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America. Provide seed of the grass species, proportions, and minimum percentages of purity, germination, and maximum percentage of weed seed, as specified in this SECTION.

2.4.2 The "Schedule of Grass Seed Requirements" is as follows:

2.4.2.1 Seed mixture shall be placed as shown on the Contract Drawings and shall be seeded with 150 lbs/acre of seed conforming to the following mix (by weight):

Percent Mix	Latin Name	Common Name
30%	Festuca arundinacea "Clemfine"	Clemfine Tall Fescue
20%	Festuca longifolia "Relient"	Relient Hard Fescue
10%	Festuca rubra "Jamestown"	Jamestown Chewings Fescue
15%	Andropogon scoparius	Little Bluestem
10%	Andropogon gerardi	Big Bluestem
10%	Sorghastrum nutans	Indian Grass
5%	Panicum virgatum "Blackwell"	Blackwell Switchgrass
5%	Trifolium repens	White Clover

2.4.2.2 In addition to seed mixture listed above, a 100 percent application of annual rye grass - Lolium Multiflorum will be hydroseeded at the rate of 150 lbs/ac (98% purity; 90% germination) on the landfill to prevent erosion. Seeding will take place immediately following final grading in the event final grading is completed outside the recommended planting times for seed mixture listed in 2.4.2.1.

2.5 Miscellaneous Landscape Materials:

2.5.1 Hydromulch Adhesive:

2.5.1.1 Provide adhesive in quantities recommended by manufacturer for slopes graded between 2:1 and 3:1, and incorporate into the hydroseed slurries.

2.5.1.2 Provide the following:

2.5.1.2.1 A non-ionic galatomannan polysaccharide that forms a colloidal dispersion. Once adhesive film is formed and has been allowed to dry or cure, its resistance to solubility increases. Adhesive film shall be biodegradable, so that it eventually is broken down by water and/or by microbial action.

2.5.1.2.2 Color: off-white with orange specks dispersed throughout.

2.5.1.2.3 Viscosity: 3000 CPS +/- 500 1 percent Sol. 25 degrees C 24 hours. Brookfield Viscometer 3 Spindle, 20 rpm.

2.5.1.2.4 pH: 6 to 7.

2.5.2 Mulch:

2.5.2.1 Anti-erosion mulch: Provide clean, seed-free salt hay or threshed straw or wheat, rye oats or barley, free from noxious weeds. Materials which are low grade and unfit for farm use, such as "U.S. Sample Grade" are acceptable.

2.5.2.2 Peat mulch: Provide peat moss in natural, shredded or granulated form, of fine texture, with a pH of 4 to 6 and a water absorbing capacity of 1100 to 2000 percent.

2.5.2.3 Wood Cellulose Fiber Pulp:

2.5.2.3.1 Provide specially prepared wood cellulose fiber, processed to contain no growth or germination inhibiting factors.

2.5.2.3.2 Moisture content not to exceed 10 percent air dry weight, manufactured so that after addition and agitation in slurry tank the fibers become uniformly suspended to form a homogeneous slurry that when hydraulically sprayed on the ground the material will form a blotter like ground cover impregnated uniformly with seed and which after application allows the absorption of moisture, either rainfall or mechanical watering, to percolate to the underlying soil.

2.5.2.4 Water: Potable.

3. EXECUTION

3.1 Inspection

3.1.1 Contractor and his installer shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify Contracting Officer of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Contracting Officer.

3.2 Preparation

3.2.1 The Contractor shall:

3.2.1.1 Spread the topsoil mixture to a minimum depth of 6 inches as described in SECTION 02920: TOP SOIL. Do not spread soil while in a frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or that clods will not break readily.

3.2.1.2 Apply ground limestone, by machine, over all areas that are to be hydroseeded as required to bring the soil to a neutral pH. Work lightly into the top 3 inches of the topsoil at least five days before applying the commercial fertilizers.

3.2.1.3 Apply superphosphate for turfbed areas at the rate of 20 pounds per 1000 square feet and incorporate into the top 3 inches of the topsoil mixture.

3.2.1.4 Grade hydroseed areas to smooth, even surface with loose, uniformly fine texture. Remove all stones and extraneous foreign material in excess of 1-inch in diameter. Roll and rake and remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

3.3 Installation

3.3.1 Hydroseeding:

3.3.1.1 The Contractor shall prepare seedbed as described for turfbed under 3.2.1. above.

3.3.1.2 Hydraulic seeding equipment shall arrive on the site empty and clean. Use hydraulic equipment with a power-driven built-in paddle agitation system with a minimum tank capacity of 1500 gallons.

3.3.1.3 Proportions for seed slurries to be homogeneously mixed per instructions below:

3.3.1.3.1 100 gallons of water per 50 pounds of wood fiber pulp, as determined by the capacity of the equipment used.

3.3.1.3.2 150 pounds of seed per acre.

3.3.1.3.3 (3)-44 pound bags of 18-24-6 starter fertilizer per acre.

3.3.1.3.4 30 bales of wood fiber pulp (approx. 1800 pounds) per acre.

3.3.1.3.5 Add hydro mulch adhesive as described in 2.1.G.1.

3.3.1.3.6 Depending on installation conditions encountered, as specified, add a tackifier.

3.3.1.4 Immediately before seeding, rework the turfbed areas until they provide a finely pulverized smooth seedbed, varying not more than 1/2 inch in ten feet. All inequities and soft spots shall be corrected before seeding.

3.3.1.5 With water filling the tank and equipment power at 1/3 to full throttle begin agitation; load fertilizer, seed and mulch in that order.

3.3.1.6 When tank is half full, add hydromulch adhesive, pouring slowly into tank into the area of most agitation.

3.3.1.7 Continue to fill with water until all components are loaded.

3.3.1.8 Spray the slurry over the area covering a "marked hydroseed area", using a properly chosen nozzle, to ensure correct rate of application. Start spraying with power and agitation on full, then throttle down to proper rate of application.

3.3.1.9 Prevent damage or staining of construction or other planting adjacent to hydro seeded areas.

3.3.1.10 Prevent foot or vehicular traffic, or the movement of equipment over the seeded areas. Reseed areas damaged as a result of such activity.

3.3.1.11 Prevent the seeded areas from drying out. After seedlings appear in about 2-3 weeks reseed all bare spots larger than 18-inches in diameter. Areas to be reseeded shall be hand ranked to scarify the surface and seed shall be applied by cyclone spreader. Lightly rake the seed into the soil.

3.3.2 Erosion Control

3.3.2.1 If grading is completed outside appropriate planting times, the site shall be hydroseeded with Lolium Multiflorum, annual rye grass to inhibit erosion until planting can be completed within the appropriate planting times.

3.4 Maintenance

3.4.1 The Contractor shall begin maintenance immediately after planting.

3.4.2 The Contractor shall maintain grass for not less than the period stated below, and longer as required to establish an acceptable stand, as determined by Contracting Officer.

3.4.2.1 The Contractor shall maintain grass seed turf for not less than one (1) growing season.

3.4.2.2 If seeded in fall and not given one full (1) growing season of maintenance, or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.

3.4.3 The Contractor shall maintain all hydroseeded areas by repairing all erosion and reseeding as necessary to establish a uniform stand of grass and continue until final acceptance.

3.4.4 Grass shall be mowed once (1) each year. Mowing shall take place in August or September.

3.4.5 Instruct PAFB's personnel in the proper maintenance of landscape Work. Review of Operations and Maintenance Data sheet submitted and be sure all instructions are clearly understood by PAFB's personnel.

3.4.6 Contractor shall provide and maintain temporary piping and hoses and watering equipment as required to convey water from water source and to keep landscape Work moist as required for proper growth. Contractor shall supply required irrigation materials and equipment. Potable water will be available from PAFB at no charge to the Contractor.

3.5 Cleanup and Protection

3.5.1 During hydroseeding Work, store materials and equipment where directed. Keep pavements clean and work area in an orderly conditions.

3.5.2 The Contractor shall protect hydroseeded Work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged hydroseeded Work as directed.

3.5.3 Take all precautions to insure that hydroseed slurry, is only placed on the areas designated. Completely clean any overspray, on areas not designated to receive slurry, to the satisfaction of Contracting Officer.

3.5.4 The Contractor shall remove all rubbish, equipment and rejected materials from the site.

3.5.5 Protection includes all temporary fences, barriers and signs and other Work incidental to proper maintenance.

3.6 Inspection and Acceptance

3.6.1 When the hydroseeding Work is completed, including maintenance, Contracting Officer will make an inspection to determine acceptability.

3.6.2 Where inspected hydroseeding Work does not comply with the requirements, replace rejected Work and continue specified maintenance until reinspected by Contracting Officer and found to be acceptable. Remove rejected materials promptly from the project site.

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SECTION 02920

TOPSOIL

1. GENERAL:

1.1 Scope.

1.1.1 Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install 6 inches of topsoil and indicated soil amendments. Topsoil shall be placed atop the final landfill cover and upon all areas disturbed during construction, including but not limited to, the construction of berms and swales.

1.1.2 The types of topsoil Work required include the following:

1.1.2.1 Topsoil from off-site sources.

1.1.2.2 Topsoil testing to provide certified acceptability of topsoil for landscape Work.

1.1.2.3 Topsoil amendments, as may be required by test results to provide topsoil acceptable for landscape Work.

1.1.2.4 Spreading topsoil.

1.1.2.5 Maintenance Work.

1.2 Coordination. Review installation procedures under other SECTIONS and coordinate the installation of soil amendments that must be installed with the topsoil.

1.3 Related Sections.

1.3.1 SECTION 02100: CLEARING AND SITE CLEANING.

1.3.2 SECTION 02225: EXCAVATION AND BACKFILL.

1.3.3 SECTION 02226: FINAL COVER CONSTRUCTION.

1.3.4 SECTION 02430: STORM DRAINAGE SYSTEM.

1.3.5 SECTION 02480: HYDROSEEDING

1.4 Quality Assurance.

1.4.1 Source Quality Control.

1.4.1.1 Off-Site Topsoil. Obtain topsoil only from naturally well-drained sites where topsoil occurs at a depth of not less than 4-inches; do not obtain from bogs or marshes.

1.4.2 Reference Standards. Comply with applicable provisions and recommendations of the following, except where otherwise shown or specified.

1.4.2.1 American Society for Testing and Materials, ASTM.

1.4.2.2 Association of Official Analytical Chemists.

1.4.3 Required Tests.

1.4.3.1 Particle Size Distribution and Hydrometer Test ASTM D422-90; Percent Organics D2974-87. The above tests shall be verified by testing one (1) composite sample from the imported top soil at least once or as directed by the Contracting Officer. A composite sample is a sample made up of five (5) grab samples taken randomly throughout the material.

1.4.3.2 pH ASTM D4972. The pH of the top soil shall be verified by testing one (1) composite sample from the imported top soil at a rate of one (1) test per three (3) acres. A composite sample is a sample made up of five (5) grab samples taken randomly throughout the material.

1.4.4 Certified Clean.

1.4.4.1 All topsoil brought on site shall be certified clean.

1.4.4.2 Certified clean shall be verified by taking one (1) composite sample from the imported top soil and analyzing it for full Toxcity Characteristic Leaching Procedure (TCLP). A composite sample is defined as a sample made up of five (5) grab samples taken randomly throughout the material. The topsoil shall be sampled on-site. Any topsoil failing TCLP testing shall be removed by the Contractor, as directed by the Contracting Officer, at no expense to the government.

1.5 Submittals.

1.5.1 Submit the following for approval by the Contracting Officer:

1.5.1.1 Before delivery of off-site topsoil, a written statement giving the location from which the topsoil is to be obtained, the names and addresses of the suppliers, the depth to be stripped and the crops grown during the past 2 years.

1.5.1.2 Manufacturer's specifications and application instructions for all soil amendments required.

1.5.2 Test Reports: Before delivery of off-site topsoil, submit for

approval the results of the following tests performed by the Contractor's Testing Laboratory:

1.5.2.1 Particle size distribution.

1.5.2.2 pH.

1.5.2.3 Percent clay.

1.5.2.4 Percent organics.

1.5.3 Certificates: Submit for approval certificates of inspection as may be required by governmental authorities to accompany shipments, and manufacturer's or vendors certified analysis for soil amendments. For standard products submit other data substantiating that materials comply with specified requirements.

1.6 Job Conditions. Topsoil shall not be delivered in a frozen or excessively wet condition.

1.6.1 Do not spread topsoil if site condition is unsuitable due to frost, excessive moisture or other conditions. Cease Work until the topsoil is in a suitable condition as determined by Contracting Officer.

2. PRODUCTS

2.1 Topsoil.

2.1.1 Fertile, Friable, Loam-Sandy Loam surface soil.

2.1.1.1 The particle size distribution shall be meet the following requirements:

Sieve Size	Percent Passing
2 inch	100
No. 4	90 - 100
No. 200	35 - 60

2.1.1.2 Clay content of material passing 200 sieve shall not be greater than 20 percent.

2.1.1.3 pH 5.5 to 7.5.

2.1.1.4 Acceptable topsoil shall not contain less than 5 percent nor more than 20 percent organic matter, as determined by ASTM D2974-87.

2.1.2 Stripped Topsoil for Reuse. Reusable topsoil shall be limited to friable loam, reasonably free of subsoil, clay lumps, brush, roots, weeds or other objectionable vegetation, stones or similar objects larger than two inches in any dimension, litter, or other materials unsuitable or

harmful to plant growth. Contractor shall receive approval from Contracting Officer prior to reuse.

2.2 Soil Amendments.

2.2.1 Lime. Natural limestone containing not less than 85 percent of total carbonates, ground so that not less than 90 percent passes a 20-mesh sieve and not less than 50 percent passes a 100-mesh sieve.

2.2.2 Fertilizer. As specified under applicable SECTIONS.

2.2.3 Peat Humus. Provide peat humus which is a natural product of either sphagnum moss, reed, or sedge peat, taken from a freshwater site, Supply shredded material, free from lumps, roots, stones and other extraneous foreign matter, capable of passing through a 1/2-inch screen, which can easily be incorporated with the topsoil. Supply material which has been conditioned in storage piles after excavation for at least 6 months, including one freezing and thawing period. Supply peat humus with the following analysis:

2.2.3.1 Not less than 90 percent organic matter by weight on an oven dry basis.

2.2.3.2 pH range 5.0 to 7.5.

2.2.3.3 Moisture content 35 percent at time of incorporation into soil.

2.2.3.4 Water absorbing ability 150 to 350 percent by weight.

3. EXECUTION.

3.1 Inspection. Contractor and his installer shall examine the subgrade, verify the elevations, observe the conditions under which Work is to be performed, and notify Contracting Officer of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Contracting Officer.

3.2 Installation.

3.2.1 The Contractor shall place and spread topsoil, over the areas shown, to a minimum depth of 6-inches after natural settlement and light rolling, in a manner that the completed work conforms to the lines and grades shown.

3.2.2 Do not spread topsoil while in a frozen condition or when moisture content is so great that excessive compaction will occur nor when so dry that dust will form in the air or that clods will not break readily.

3.2.3 Do not compact topsoil.

3.2.4 After the topsoil is spread, remove all large, stiff clods, rocks, roots, or other foreign matter over 2 inches.

3.2.5 If required, Natural limstone that is dry and free-flowing shall be evenly spread over the area to be seeded at a rate to produce a pH value between 5.5 - 7.5.

3.2.6 The Contractor shall apply soil amendments, as required by machine over all areas receiving topsoil. Rototill lightly into the top 3 inches of topsoil to thoroughly mix all components.

3.2.7 The Contractor shall spread topsoil to attain a properly drained surface.

3.2.8 The Contractor shall grade topsoil areas to smooth, even surface with loose, uniform, fine texture.

3.2.9 The Contractor shall roll and rake and remove ridges and fill all depressions, ruts, low spots, or unsuitable areas which result after settlement so that the area is suitable for subsequent work.

3.3 Maintenance.

3.3.1 The Contractor shall maintain topsoiled areas by filling in erosion channels and correcting drainage as required.

3.3.2 The Contractor shall maintain the topsoil in a loose, friable condition until the Work under other SECTIONS begins.

3.4 Clean Up and Protection.

3.4.1 During topsoiling Work, store materials and equipment where directed. Keep pavements clean and areas in an orderly condition.

3.4.2 The Contractor shall protect topsoil Work and materials from damage due to topsoil operations, operations by other contractors and trespassers. Maintain protection during installation and maintenance periods. Repair damaged topsoiled Work as directed by the Contracting Officer.

3.4.3 Protection includes all temporary fences, barriers and signs, and other Work incidental to proper protection.

3.4.4 The Contractor shall remove all rubbish, equipment and rejected materials from the site.

3.5 Inspection and Acceptance.

3.5.1 When the topsoiling Work is completed, including maintenance, Contracting Officer will make an inspection to determine acceptability.

3.5.2 Where inspected topsoil Work does not comply with the requirements, regrade rejected Work and maintain until reinspected by Contracting Officer and found to be acceptable.

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SPECIFICATIONS FOR
PLATTSBURGH AIR FORCE BASE LANDFILL NO. 023

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Division No. 6
WOOD AND PLASTICS

SPECIFICATIONS FOR
PLATTSBURGH AIR FORCE BASE LANDFILL NO. 023

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SPECIFICATIONS FOR
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SECTION 06300

GEOSYNTHETICS

1. GENERAL

1.1 Scope: Contractor shall provide all labor, materials, equipment, testing, and services necessary for the placement of geotextile filter fabric, erosion control fabric and blanket as shown on the Contract Drawings and as specified herein. The following is a list of geosynthetic materials and areas where they are to be used by the Contractor (but not limited to):

1.1.1 The Contractor is to use Geotextile Filter Fabric:

1.1.1.1 Below the gas venting layer.

1.1.1.2 Above the drainage layer.

1.1.1.3 Under riprap.

1.1.2 The Contractor is to use Erosion Control Blanket:

1.1.2.1 On landfill side slopes steeper than 8% (12.5 Horizontal: 1 Vertical).

1.1.3 The Contractor is to use Geotextile Erosion Control Fabric:

1.1.3.1 In grassed drainage swales, as detailed in the Contract Drawings.

1.2 Related Sections:

1.2.1 SECTION 02226: FINAL COVER CONSTRUCTION.

1.2.2 SECTION 02430: STORM DRAINAGE SYSTEM.

1.2.3 SECTION 06450: PVC COMPOSITE GEOMEMBRANE.

1.2.4 SECTION 06600: POLYETHYLENE PIPE.

1.3 Quality Assurance

1.3.1 Geosynthetic Manufacturer

1.3.1.1 The Contractor shall obtain all geosynthetic material from a single Geosynthetic Manufacturer.

1.3.1.2 The Geosynthetic Manufacturer shall be a specialist in the manufacture of the particular material and have produced a minimum of five million square feet.

1.3.2.2 Quality Control During Manufacture

1.3.2.2.1 All geosynthetics shall be randomly sampled and tested by the Geosynthetic Manufacturer in accordance with the Geosynthetic Manufacturer's approved quality control program manual to evaluate the required physical properties. In addition, one sample of each geosynthetic type shall be provided to the government by the Contractor for quality assurance testing and permanent record of the actual furnished materials. Each sample shall be the full manufactured width of the geotextile by at least 5 feet long. Samples not meeting the minimum requirements specified shall result in the rejection of corresponding rolls. Samples shall be submitted a minimum of 30 days prior to the beginning of installation of the geosynthetic material.

1.3.2.2.2 The Contractor shall furnish the Contracting Officer with six copies of a mill certificate or affidavit signed by a legally authorized official from the company manufacturing the geosynthetic. The mill certificate or affidavit shall attest that the geotextile meets the chemical, physical and manufacturing requirements stated in this specification.

1.3.2.2.3 No geosynthetic shall be shipped until the affidavit is submitted to Contracting Officer.

1.4 Submittals:

1.4.1 Shop Drawings:

1.4.1.1 Refer to SECTION 01341: SHOP DRAWING PROCEDURES for additional requirements relating to shop drawing submittals.

1.4.1.2 Shop drawings shall include anchorage details, penetration details and a layout plan.

1.4.1.3 The Contractor shall furnish the Contracting Officer with one sample of each geosynthetic type, a copy of the geosynthetic manufacturer's quality control program manual and six copies of the manufacturer's data, specifications and installation instructions.

1.5 Product Delivery, Storage and Handling

1.5.1 Each roll of geotextile and geosynthetic material delivered to the site shall be labelled by the Geosynthetic Manufacturer identifying the manufacturer's name, product identification, lot number, manufacture date, roll number and roll dimensions.

1.5.2 All materials shall be protected from ultraviolet degradation, precipitation or other inundation, mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions immediately upon arrival at site and throughout installation by the Contractor. Geotextile and geosynthetic rolls shall be shipped and stored in relatively opaque and watertight wrapping. Geosynthetics shall be stored off the ground surface, and the surrounding area shall be graded to prevent stormwater inundation.

1.5.3 Contractor shall provide all labor and equipment required to assist Contracting Officer in inspection of materials upon delivery to the site.

2. PRODUCTS

2.1 Geotextile Filter Fabric

2.1.1 Geotextile shall be a needle punched, nonwoven fabric composed of filaments which are formed into a stable network such that the filaments retain their relative position. Geotextile filter fabric shall be inert to biological degradation and naturally encountered chemicals, alkalies, and acids. Typical geotextile filter fabric properties for the various applications are listed as follows:

Fabric Property	Unit	Test Method[1]	Value[2] (ASTM)			
			Gas Vent /Drainage Separator	PVC Composite Laminant	Rip Rap Cushion	Silt Fence
Unit Weight	oz/yd^2	D3776	3.8	6.0	12	3.5
Thickness	mils	D1777	55	85	130	50
Trapezoid Tear Strength	lbs.	D4533	45	60	110	250 x 250[3]
Grab Tensile Elongation	%	D4632	50	125	60	100[4]
Puncture Resistance	lbs.	D4833	50	70	135	---
Mullen Burst	psi.	D3786	140	240	400	1500
Apparent Opening Size	mm	D4751	>0.25	0.210	0.180	---
Flow Rate	$gal/min/ft^2$	D4491	220	125	75	---
Permittivity	sec^{-1}	D4491	2.9	1.6	1.0	---

1. Note, ASTM test methods shall be in accordance with latest version.
2. Note, values from ASTM test procedures. All materials delivered to the site shall meet these values.
3. Test Method ASTM D 1117.
4. Test Method ASTM D 1388.

2.1.2 The Contractor shall provide geotextile filter fabrics:

2.1.2.1 Below the Gas Venting and Barrier Protection Layer to separate the Cap Subgrade and Drainage Layer, respectively.

2.1.2.1.1 Materials used shall be 3.8 oz/syd non-woven, needle punched, polypropelene geotextile filter fabric.

2.1.2.2 Factory-laminated to the PVC Composite Geomembrane:

2.1.2.2.1 Materials used shall be 6.0 oz/syd PET non-woven geotextile filter fabric.

2.1.2.3 Underneath Rip rap

2.1.2.3.1 Materials used shall be 12.0 oz/syd non-woven, needle punched, polypropelene geotextile filter fabric

2.2 Geotextile Erosion Control Fabric

2.2.1 Permanent, nonbiodegradable geotextile erosion control fabric, mesh matrix with carbon stabilizer, melt bonded at intersections, supplied in rolls, meeting the following criteria:

Thickness, inches	0.75
Weight	
Average, oz/syd	12.0
Minimum, oz/syd	11.1
Filament Diameter, inches	0.016
Tensile Strength, lbs/foot	
Length Direction, min.	250
Width Direction, min.	120
Elongation, percent	
Length Direction, max.	75
Width Direction, max.	75

2.2.2 Staples as detailed on the Contract Drawings.

2.2.3 Material to be installed as per manufacturer's recommendations and as specified herein.

2.2.4 Geotextile erosion control fabric shall be placed in the perimeter swales as shown on the Contract Drawings.

2.3 Erosion Control Blanket

2.3.1 Erosion Control Blanket shall be a biodegradable material designed for steep slopes, containing a maximum of 70 percent wheat straw and a minimum of 30% coconut fiber, supplied in rolls, sewn together with biodegradable thread. The Contractor shall place Erosion Control Blanket

on the landfill side slopes and sedimentation basin where slopes are steeper than 8% (12.5 Horizontal: 1 Vertical).

2.4 Silt Fence

2.4.1 The silt fence shall be a geotextile fabric and shall be a woven pervious sheet of plastic yarn as defined by ASTM D 123-90. The geotextile fabric shall be one that is recommended for such use by the manufacturer. The geotextile fiber shall consist of a long-chain synthetic polymer compound composed of at least 85 percent by weight polypropylene, ethylene, ester, amide or vinylidenechloride and shall contain stabilizers and inhibitors added to the base plastic, if necessary, to make the filaments resistant to deterioration due to ultraviolet and heat exposure. The edges of the geotextile fabric shall be finished to prevent the outer fiber from pulling away.

2.4.2 The seams of the geotextile fabric shall be sewn with thread of a material meeting the chemical requirements given above for geotextile yarn. Factory seams shall be tested in accordance with method ASTM D1683-90, using 1 inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall not be less than 90 percent of the required tensile strength of the geotextile fabric in any direction.

2.4.3 All brands of geotextile fabric and all seams to be used shall meet the requirements specified herein and in paragraph 2.1.1 of this SECTION.

3. EXECUTION

3.1 Installation - General

3.1.1 The Contractor shall weight all geotextiles and geosynthetics with sandbags or the equivalent when required. Such sandbags shall be used during placement and shall remain until replaced with cover material or geomembrane.

3.1.2 If light colored geotextile is used, the Contractor will take precautions against "snowblinding" of personnel.

3.1.3 Contractor shall take any necessary precautions to prevent damage to completed work and underlying layers during placement of each geotextile geosynthetic.

3.1.4 During placement of geosynthetics, the Contractor shall take care not to entrap in the geotextiles and geosynthetics materials such as stone, excessive dust, or moisture that could damage the geomembrane, generate clogging, hamper subsequent seaming or product performance.

3.1.5 The Contractor shall ensure that geosynthetic filter fabrics are not exposed to precipitation prior to being installed, and are not exposed to direct sunlight for more than 15 days.

3.1.6 The separator geotextile filter fabric shall not be exposed to construction traffic, shall be placed on a smooth, dry, surface and shall

be protected from precipitation by the Contractor. Wet or damaged fabric shall be replaced by the Contractor at no additional expense to the government.

3.1.8 The Contractor shall complete excavation of fill materials over geosynthetics by hand with plastic shovels.

3.2 Geotextile Filter Fabric

3.2.1 The Contractor shall unroll geotextile filter fabrics in a direction normal to the slope unless otherwise directed by the Contracting Officer.

3.2.2 On slopes of 8% or less, geotextile filter fabric shall be overlapped 12 inches and spot lystered a minimum of once every 3 feet, or overlapped 4 inches and sewn. On slopes steeper than 8% the geotextile shall be overlapped 4 inches and sewn by the Contractor. Overlaps shall be oriented in the direction of earth filling.

3.2.3 Any burn mark, hole or tear in the geotextile filter fabric shall be repaired by the Contractor as follows at no additional cost to the government:

3.2.3.1 A fabric patch shall be sewn into place using a double sewn lock stitch (1/4 inch to 3/4 inch apart and no closer than 1 inch from any edge).

3.2.3.1.1 On slopes with a grade less than 8 percent, the Contractor may use a fabric patch spot lystered in place with a minimum overlap of 24 inches in all directions.

3.2.4 Should any damaged area exceed 10 percent of the width of the roll, the roll shall be cut and overlapped to form a new seam.

3.3 Erosion Control Fabric

3.3.1 The Contractor shall install per manufacturer's recommendations for high runoff velocities and as shown and specified herein.

3.3.2 The Contractor shall grade and prepare subgrade to be stable and firm, but not crusted.

3.3.3 The Contractor shall apply erosion control fabric with the length of roll laid parallel to the flow of the water in swales or normal to the slope. Start the installation with the initial strip placed in the center of the swale to avoid overlaps in the center of the ditch. Staple all lap joints and upsloped edges at intervals of 3 feet or less.

3.3.4 The Contractor shall drive all staples to within 1 inch of finished grade.

3.3.5 The Contractor shall install an anchor slot at the upslope and downslope limits of the erosion control fabric placement. The Contractor shall bury at least 12 inches of the end of the erosion control fabric

vertically in the anchor slots. The Contractor shall secure the erosion control fabric in the anchor slot with staples at intervals of 3 feet or less prior to burying. The Contractor shall backfill and tamp the soil against the geotextile erosion control fabric in the slot.

3.3.6 The Contractor shall overlap successive lengths of erosion control fabric at least 12 inches, with the upslope length on top. The Contractor shall staple the overlap by spacing staples across the end of each of the overlapping lengths at 10" intervals.

3.3.7 The Contractor shall construct erosion stops by placing a fold at least 8 inches vertically into the soil. The Contractor shall stake the geotextile erosion control fabric in the erosion stop and at each edge overlap and in the center of erosion control fabric. The Contractor shall construct check slots at a frequency of:

3.3.7.1 Every 25 feet in the drainage swales, or

3.3.7.2 terminate upslope edges of the erosion control fabric (lining swales) on 6-inch wide horizontal shelves, running parallel to the axis of the ditch and for the full length of the ditch as shown on the Contract Drawings. The Contractor shall staple edges of the erosion control fabric at 3-foot intervals. The Contractor shall place a minimum of 6" of top soil to original slope.

3.3.9 After the erosion control fabric has been placed, the Contractor shall seed the area as specified in SECTION 02480: HYDROSEEDING.

3.3.10 The Contractor shall maintain the erosion control fabric until all Work has been completed and accepted by the Contracting Officer. Maintenance shall consist of the repair of areas where damaged by any cause.

3.4 Erosion Control Blanket

3.4.1 Erosion Control Blanket shall be installed as per manufacturer's instructions.

3.5 Silt Fence

3.5.1 The Contractor shall reject, at the time of installation, geotextile fabric if it has defects, flaws, rips, holes, deterioration or damage incurred during manufacture, transportation or storage and replace rejected materials at no additional cost to the Government.

3.5.2 The Contractor shall place the geotextile fabric with the long dimension parallel to the limits of excavation and shall lay the material smoothly and free of tension, stress, folds, wrinkles or creases.

3.5.3 Seams

3.5.3.1 The Contractor shall make all seams by sewing.

3.5.3.2 All seams shall be "J" type with interlocking thread.

3.5.4 Geotextile fabric damaged during its installation or at any time thereafter shall be replaced by the Contractor at no additional cost to the government.

3.5.5 The Contractor shall bury the geotextile fabric at least 6 inches deep, however, the installed geotextile shall extent at least 2 feet above the ground. The Contractor shall space fence posts 8 feet center to center. The Contractor shall place the posts so that they extend at least 2 feet into the ground and to the top of the fabric.

3.6 Placement Of Cover Materials

3.6.1 Contractor shall place all cover materials in such a manner to ensure:

3.6.1.1 The geotextiles and geosynthetic are not damaged.

3.6.1.2 Minimal slippage of the geotextiles and geosynthetics occurs on the underlying layers.

3.6.1.3 No excess tensile stresses are induced on the geotextiles and geosynthetics.

3.6.2 Contractor shall employ spotters for each piece of equipment placing cover materials to direct filling sequences so as to prevent damage to any geotextile and geosynthetic and to identify areas requiring repair.

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SECTION 06400

PVC GEOMEMBRANE

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish all labor, materials, equipment and incidentals required to supply, install, field seam and test a 40 mil polyvinyl chloride (PVC) geomembrane as shown on the Contract Drawings and specified herein.

1.1.2 The Contractor shall install 40 mil PVC Geomembrane on all side slopes with 8% grades (12.5 Horizontal: 1 Vertical). In all areas with side slopes steeper than 8%, refer to SECTION 06450: PVC COMPOSITE GEOMEMBRANE.

1.1.3 Related Sections.

1.1.3.1 SECTION 02226: FINAL COVER CONSTRUCTION

1.1.3.2 SECTION 06450: PVC COMPOSITE GEOMEMBRANE

1.1.3.3 SECTION 06500: COLD WEATHER INSTALLATION

1.1.3.4 SECTION 15351: GAS VENT INSTALLATION

1.2 Quality Assurance

1.2.1 Reference Standards: The Contractor shall comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1.2.1.1 Standards of American Society for Testing and Materials (ASTM).

1.2.1.2 National Sanitation Foundation, Standard 54 for Flexible Membrane Liners (NSF 54).

1.2.2 Geomembrane Manufacture

1.2.2.1 The Contractor shall obtain all geomembrane material from a single Geomembrane Manufacturer.

1.2.2.2 The Contractor's Geomembrane Manufacturer shall have at least five years experience in PVC geomembrane manufacture and must have manufactured a minimum of 10 million square feet of 40 mil or heavier PVC geomembrane during the past five years.

1.2.3 Geomembrane Fabrication

1.2.3.1 The Contractor shall retain a single Geomembrane Fabricator to fabricate all geomembrane panels.

1.2.3.2 The Contractor's Geomembrane Fabricator shall be a specialist in the fabrication and installation of 40 mil unsupported polyvinyl chloride geomembranes and shall have at least five years experience in the fabrication and installation of 40 mil or heavier unsupported PVC. The Geomembrane Fabricator shall have satisfactorily fabricated and installed at least 10 million square feet of 40 mil or heavier PVC geomembrane during the past five years.

1.2.4 Geomembrane Fabricator's Field Services and Reports:

1.2.4.1 The Contractor's Geomembrane Fabricator shall provide factory-trained Geomembrane Installers with demonstrated ability and experience in the field seaming, field testing, and overall supervision of geomembrane placement. The Contractor's Geomembrane Installers shall:

1.2.4.1.1 Inspect the subgrade prior to geomembrane placement, supervise corrective work required and prepare an inspection report for submission to the Contracting Officer.

1.2.4.1.2 Inspect the subgrade prior to geomembrane placement to determine whether a soil sterilant is required and prepare an inspection report for submission to the Contracting Officer.

1.2.4.1.3 Supervise the unloading, handling and storage of geomembrane panel sections.

1.2.4.1.4 Supervise the handling, unfolding and placement of all geomembrane panel sections over the prepared subgrade.

1.2.4.1.5 Perform all field seaming and testing of geomembrane.

1.2.4.1.6 Perform all repairs to damaged geomembrane sections without additional cost to the Government.

1.2.4.1.7 Perform all repairs to factory defects without additional cost to the Government.

1.2.4.1.8 Supervise the placement of intermediate drainage layer/geomembrane cover material.

1.2.4.1.9 Prepare a written report at the conclusion of the work which includes the following:

1.2.4.1.9.1 Complete description of geomembrane, including but not limited to, chemical composition, physical properties and Geomembrane Manufacturer.

1.2.4.1.9.2 Complete description of field seaming system, including bonding solutions, seam width cure or aging time, field sampling and testing procedures, and copies of all test reports.

1.2.4.1.9.3 "As-built" drawings showing actual layout of geomembrane panel sections and anchor trench pipe penetration and gas vent penetration details, location of destructive samples and repairs.

1.2.4.1.9.4 An affidavit of compliance containing the following wording: "I (name and title), as the duly authorized representative of (Company name), hereby certify that the installation of the 40 mil PVC geomembrane has been completed in accordance with the terms and conditions of the Contract Documents.

By _____
(signature)

(Corporate Seal) Witness: _____
(signature)

Date: _____

1.3 Quality Control During Manufacturing and Fabrication

1.3.1 Random sampling and testing of the geomembrane material shall be performed by the Geomembrane Manufacturer, at no additional cost to the government, throughout the production run to assure proper quality control. The Geomembrane Manufacturer's test results shall be provided to the Contracting Officer by the Contractor.

1.3.1.1 One (1) sample taken per acre and a minimum of one (1) sample per day or per panel, whichever is more frequent.

1.3.1.2 The Geomembrane Manufacturer shall test the samples for the following properties:

1.3.1.2.1 Uniformity: Visual inspection to assure the material is uniform and free from foreign matter.

1.3.1.2.2 Thickness: Measurement along the sample to assure that the sheet is within the specified tolerances (ASTM D 1593).

1.3.1.2.3 Tensile Properties: One (1) dimensional tensile testing which measures tensile strength at yield and at break and elongation at yield and at break shall be made (ASTM D 882) in both the machine and cross machine directions.

1.3.2 Inspection and Testing of Factory Seams:

1.3.2.1 The Geomembrane Fabricator shall perform 100 percent continuous visual inspection of each lineal foot of seam as it is produced. Upon discovery of any defective seam, the Geomembrane Fabricator shall stop production of panels used in this work and shall repair the seam and determine and rectify the cause of the defect prior to continuation of the seaming process. As evidence that the Geomembrane Fabricator has complied with the inspection requirement of this SECTION, a mark which identifies the inspector by name or number shall be hand stamped with indelible ink no less frequently than five feet on center along each factory seam. A 48 inch (1.2 meter) sample shall be taken from each factory seam welding unit used in this work at the beginning of every work shift and every four hours of production thereafter. The Geomembrane Fabricator shall cut test specimens at quarter points from each 48 inch (1.2 meter) seam sample (a total of three places) and test for factory seam strength and peel adhesion as specified in Paragraph 2.1.1.1.K,

"Factory Seam Requirements." The Geomembrane Fabricator shall maintain a log showing the date, time, panel number and test results. This log shall be made available to the Contracting Officer upon request.

1.3.2.2 The Geomembrane Fabricator shall conduct continuous non-destructive testing of all factory seams. The Geomembrane Fabricator shall maintain a log showing the date, time, panel number, test results and repairs made. This log shall be made available to the Contracting Officer upon request.

1.3.2.3 The Contractor shall supply the Geomembrane Fabricator's test results to the Contracting Officer.

1.3.3 The Contracting Officer, at his discretion, may employ and pay for an independent testing laboratory to perform additional testing of the geomembrane materials. This testing may also include all properties specified in Paragraph 2.1.1 and need not be limited to the testing performed by the manufacturer. The Contractor shall, at no additional cost, provide samples to the Contracting Officer as required.

1.3.4 The Contractor shall be solely responsible to the Contracting Officer for the quality of the material provided. Should any of the tests performed on the material yield unsatisfactory results, the Contractor will be responsible for replacing the material with satisfactory material without delaying the total project time and without any cost to the government.

1.4 Submittals

1.4.1 Shop Drawings:

1.4.1.1 Refer to SECTION 01341: SHOP DRAWING PROCEDURES for additional requirements relating to Shop Drawing submittals.

1.4.1.2 The Contractor shall submit shop drawings for approval as soon as possible after award of Contract.

1.4.1.3 Shop drawings shall include:

1.4.1.3.1 Fabrication details of geomembrane sections.

1.4.1.3.2 Layout of geomembrane sections and pipe penetration details.

1.4.1.3.3. Work plan for geomembrane installation including manpower and equipment requirements and schedule of operations.

1.4.1.3.4 Detailed description of geomembrane field testing methods to be performed.

1.4.2 The Contractor shall submit 6 copies of the Geomembrane Installer's subgrade inspection reports.

1.4.3 The Contractor shall submit 6 copies of the Geomembrane Installer's final report of geomembrane installation including but not limited to complete description of geomembrane, field seaming system, copies of test reports and "as-built" drawings.

1.4.4 Affidavit of Compliance

1.4.4.1 The Contractor shall provide 6 copies of an affidavit, certifying that all geomembrane materials furnished for this project (reference project title and number) comply with all requirements specified in the Contract Documents.

1.4.4.2 No geomembrane material shall be shipped until the affidavit is submitted to the Contracting Office.

1.4.5 The Contractor shall submit six copies of the Geomembrane Manufacturer's Quality Control test reports.

1.4.6 The Contractor shall submit six copies of the Geomembrane Fabricator's Quality Control test reports.

1.4.7 The Contractor shall submit samples of the fabricated geomembrane as requested by the Contracting Officer.

1.4.8 The Contractor shall make available the Geomembrane Fabricator's logs as requested by the Contracting Officer.

1.4.9 The Contractor shall submit six copies of a notarized letter stating the previous experience of the Geomembrane Installer.

1.4.10 The Contractor shall submit two coupon samples of the field-seamed geomembrane.

1.4.11 The Contractor shall submit six copies of the geomembrane field seam testing results.

1.5 Warranty

1.5.1 The Contractor shall provide the Contracting Officer with a warranty that the material supplied to produce the geomembrane sheets shall maintain its integrity for a period of 20 years provided that the capped landfill area is maintained by PAFB. The geomembrane material must be covered with sufficient soil cover by the Contractor within 60 days to prevent deterioration.

1.6 Product Delivery, Storage and Handling

1.6.1 The Contractor shall properly deliver, unload and store the geomembrane under the Geomembrane Installer's supervision and in such a manner as to prevent damage to the geomembrane.

1.6.2 Refer to SECTION 06500: COLD WEATHER INSTALLATION for additional requirements relating to cold weather storage of geomembrane materials.

1.6.3 Contractor shall provide all labor and equipment required to assist Contracting Officer in inspection of geomembrane materials upon delivery to the site.

2. PRODUCTS

2.1 Geomembrane Material

2.1.1 The material shall be 40 mil unsupported polyvinyl chloride (PVC) Geomembrane as supplied by the Contractor and shall be manufactured from 100 percent domestic virgin materials and specifically compounded for use as a geomembrane for a domestic waste sanitary landfill. The geomembrane material must contain a biocide at a viable formulation level. The use of water soluble formulation ingredients is prohibited. The sheet surface quality shall be good, with no cold flow, windows, or surface divits. Reprocessed material shall not be used. The geomembrane material shall meet or exceed the following material properties:

2.1.1.1 Polyvinyl Chloride (PVC):

	Property	Test Method	Value	Units
a.	Thickness	ASTM D 1593 Para. 8.1.3	40	mils min.
b.	Specific Gravity	ASTM D 792 Method A	1.20	min.
c.	Minimum Tensile Properties (each direction)	ASTM D 882		
	1) Breaking Factor	Method A or B (1 inch wide)	92 (2300)	lbs/inch width (psf)
	2) Elongation at Break[1]	Method A or B	350	percent
	3) Modulus (force) at 100% Elongation	Method A or B	36 (900)	lbs/inch width (psi)
d.	Tear Resistance	ASTM D 1004	10	lbs, minimum
e.	Low Temperature, °F	ASTM D 1790	-20°	°F
f.	Dimensional Stability	ASTM D 1204 212°F, 15 min.	5.0	each direction, percent change max.
g.	Water Extraction	ASTM D 3083 (as modified in Annex A)[2]	-0.35	percent loss max.
h.	Volatile Loss	ASTM D 1203 Method A	0.5	percent loss max.
i.	Resistance to Soil Burial	ASTM D 3083 (as modified in Annex A)[2]		percent change max. in original value
	1) Breaking Factor		5.0	
	2) Elongation at Break		20.0	
	3) Modulus at 100% Elongation		20.0	
j.	Hydrostatic Resistance	ASTM D 751 Method A	82	lbs/sq. in minimum
k.	Factory Seam Requirements:			
	1) Bonded Seam Strength	ASTM D 3083 (as modified in Annex A)[2]	74	lbs/in. width
	2) Peel Adhesion	ASTM D 413 (as modified in Annex A)[2]	Film Tearing Bond or 10 lb/in	lb/in. minimum
	3) Resistance to Soil Burial	ASTM D 3083 (as modified		

		in Annex A)[2]	percent
a)	Peel Adhesion	-20.0	change max.
b)	Bonded Seam Strength	-20.0	in original

[1]The jaw separation method is to be used to determine elongation percent.
[2]Modification to ASTM standards as per the National Sanitation Foundation Standard.
[3]ASTM Test Methods shall be in accordance with the latest versions.

This table provides a means for industry to furnish such materials of known and consistent quality. Before selection of any material for a geomembrane, however, the user should consult with appropriate manufacturers, because these materials may not be appropriate for every application. Specific information should be obtained from the manufacturers regarding installation requirements, exposure conditions, performance expectations, and experience factor.

2.1.2 The geomembrane shall have passed the Bureau of Reclamation resistance to soil burial test and have been formulated for resistance to microbiological attack. The geomembrane material shall be neutral gray to black in color and produced in a standard minimum sheet width of not less than 60 inches. Widths of the geomembrane material shall be fabricated together by means of factory-bonded seams using either dielectric heat or solvent bonding. All seams shall be lapped by the Geomembrane Fabricator, using the manufacturers recommended minimum seam width. After fabrication, the Geomembrane Fabricator shall accordion-fold geomembrane panel sections in both directions and package for minimum handling in the field during installation.

2.2 Pipe Penetration Materials

2.2.1 Pipe penetrations shall be constructed of PVC and shall be seamed a minimum of 12 inches onto the surrounding PVC cover system.

2.2.2 Sponge Rubber Sheeting: Sponge rubber sheeting shall be Type SCE -41, Neoprene/EPT/SBR, closed cell medium, 1/2 inch thick.

2.2.3 Metal Straps: Straps and bandings shall be Type 304 stainless steel.

2.2.3.1 Width: 2 inches minimum.
2.2.3.2 Thickness: 1/4 inch.
2.2.3.3 Bolting Hardware: Stainless steel Type 410.

3. EXECUTION

3.1 Preparation for PVC Geomembrane Installation

3.1.1 The preparation of the subgrade shall be the responsibility of the Contractor. Contractor shall coordinate the placement of the geomembrane with all other construction. Refer to SECTIONS 02225: EXCAVATION AND BACKFILL and 02226: FINAL COVER CONSTRUCTION for additional requirements relating to subgrade preparation.

3.1.2 The completed subgrade shall be examined by the Geomembrane Installer in the presence of the Contracting Officer and Contractor to determine whether a soil sterilant may be required. If used, the soil sterilant shall be at no cost to the government.

3.2 Sample Pipe Penetration Seal

3.2.1 The Geomembrane Installer shall demonstrate his method of preparing the pipe penetration seals by fabricating and installing a sample pipe seal on a section of pipe in the presence of the Contracting Officer. The sample shall be air tested and shall be reconstructed if necessary by the Geomembrane Installer at no additional cost to the government to assure that a satisfactory technique for construction has been established. The base of the seal shall overlap the base material forming the cover system a minimum of 12 inches in all directions.

3.3 Installation of Geomembrane

3.3.1 Refer to SECTION 06500: COLD WEATHER INSTALLATION for additional requirements relating to cold weather construction and installation of geomembranes.

3.3.2 The Contractor shall grade and compact the area to receive the geomembrane to the elevations shown on the Contract Drawings.

3.3.3 The Contractor shall treat the area to receive the geomembrane with a soil sterilant of a type and at a rate of application recommended by the Geomembrane Installer, if necessary as described in this SECTION 3.1.2.

3.3.4 The Contractor shall provide:

3.3.4.1 A work force of reasonable size to perform physical labor normally associated with placement of geomembrane panel sections at the project area.

3.3.4.2 All necessary sand bags or other hold-down devices required to prevent perimeter movement during installation. Any loss of material or damage to placed material due to failure of the Contractor to protect the Work shall be restored or replaced by the Contractor at no cost to the government.

3.3.4.3 Construction equipment with operators normally required to move, lift and spread geomembrane panel sections at the project area. In addition an air lance capable of generating a continuous force of 50 psi from a 3/16-inch diameter nozzle shall be provided.

3.3.4.4 Survey control stakes left in place to assist in placing the geomembrane sections.

3.3.4.5 Survey stakes shall be removed and holes shall be backfilled prior to placement of PVC Geomembrane.

3.3.5 Based on the approved geomembrane panel layout drawing, the Contractor shall number individual panels and sheets and identify seams by using the numbers of the panels and sheets which create the seam. The proposed layout of panels should be set and approved by the Contracting Officer, assuring efficiency of material, minimization of field seams and proper placement of field seams. The Contractor shall place field seams where normally applied stresses will be minimal. The Contractor shall overlap field seams to enhance the shedding of water collected above the geomembrane.

3.3.6 The Contractor shall check measurements and grades prior to the start of geomembrane installation. Any necessary adjustments shall be performed by the Contractor. Large panel sections of geomembrane delivered to the site, packaged in accordion-type folds, shall be unfolded by the Contractor under the supervision of the Geomembrane Installer and allowed to relax without tension prior to installation. The geomembrane shall be unfolded and placed over the prepared subgrade under the direct supervision of the Geomembrane Installer and in such a manner as to assure minimum handling. All field seams and outlet pipe seals shall be performed by the Geomembrane Installer. The Contractor shall submit a written, notarized letter which states the previous experience of the personnel being used to field seam the geomembrane to the Contracting Officer prior to the field installation. All field seams shall be made by the Geomembrane Installer using the approved solvent method. All materials to be seamed shall be cleaned of dust, moisture, condensation, frost, dirt and all other foreign objects prior to the sealing operation. If adverse conditions exist, such as mud, caked mud or clay, the Contractor will remove them by a clean water wash, and dry before starting or continuing seaming operations. Seams between factory fabricated panel sections shall be lapped as recommended by the Geomembrane Manufacturer. Wrinkled seams will not be permitted. All seams, on completion of the Work, shall be tightly bonded. All field seams shall be visually inspected and continuously air lance tested by the Geomembrane Installer as described in Paragraph 3.4. Destructive testing of field seam samples shall be conducted as described in Paragraph 3.4 by the Geomembrane Installer. Any faulty seams shall be resealed and retested. The Geomembrane Installer shall provide a full time field superintendent during the entire period of geomembrane installation, including placement of gas venting layer and geomembrane cover material.

3.3.7 The Contractor shall use no equipment that could damage the geomembrane by handling, trafficking, leakage of hydrocarbons, or other means.

3.3.8 The Contractor shall prohibit all personnel on the geomembrane from smoking, wearing damaging shoes, or engaging in other activities which could damage the geomembrane. No glass containers will be permitted on the geomembrane.

3.3.9 The Contractor shall provide spotters for each piece of equipment placing cover soils to prevent folding of Geomembrane and control lift thickness.

3.3.10 The Contractor shall place the geomembrane such that good fit without bridging is provided in all corners and grade changes. Excessive slack shall be avoided to minimize rippling during the soil cover operation.

3.3.11 Field seaming shall begin in the middle and the geomembrane Installer shall work towards an open end. This minimizes large wrinkles from becoming trapped which would require cutting and patching.

3.3.12 The chemical fusing agent shall be non-embodied, where the 40-mil PVC geomembrane shall be overlapped and the mating surfaces chemically melted and fused together. If a good seam is not initiated by the fusion

agent, the seam will generally separate and open up by itself within the first 1/4 to 1/2 hour.

3.3.13 Once alignment and overlaps are correct, the Geomembrane Installer shall apply a controlled amount of the chemical fusion agent between the two panels to be seamed, one to two feet of seam length at a time. The Geomembrane Installer shall apply pressure manually (roller or rolled up clean cloth) to distribute the agent evenly and generate an interaction between the two surfaces. A small amount of agent should be observed at the edge of the seam. Once the section is complete, the Geomembrane Installer shall remove excess seaming agent with a cloth.

3.3.14 If discontinuities are noted, the Geomembrane Installer shall allow the seaming agent to dissipate (approximately 1/2 hour) before reapplying seaming agent.

3.4 Field Quality Control During Installation

3.4.1 Test Methods for Field Fabricated Seams:

3.4.1.1 Air Lance Test: All field seams shall be inspected by the Geomembrane Installer for unbonded areas using an air nozzle directed on the upper seam edge and surface to detect loose edges, riffles indicating unbonded areas within the seam, or other undesirable seam conditions. All bonded seams shall be checked using a minimum 50-lb/in^2 (345 kPa) (gage) air supply directed through a 3/16 inch (typical) nozzle, held not more than 2 inches (51 mm) from the seam edge and directed at the seam edge. Discontinuities or unbonded areas shall be marked for repair by the Geomembrane Installer. Air lance testing shall be performed in the presence of the Contracting Officer.

3.4.1.2 Field Fabricated Startup Seam for Testing: The Geomembrane Installer shall provide a representative seam fabricated from the same sheet material and using the same seaming methods as those recommended by the Geomembrane Manufacturer for this project. The startup seam shall be no less than 10 feet in length and shall be provided at the start of each day's or shift's seaming. Random samples for shear and peel testing shall be cut from the startup seam. The seam shall be allowed to cure or age properly before testing in accordance with Geomembrane Installer's directions. Each sample shall be identified with; date, project name, seamers name, time and ambient air temperature.

3.4.1.3 The Contracting Officer will request that field cutouts be made by the Geomembrane Installer of the field seams. A minimum of one sample per seaming crew per day shall be cut from the installed PVC geomembrane by the Geomembrane Installer or one sample for each 500 linear foot of completed seam by each seaming crew at a location approved by the Contracting Officer. The cutout shall be wide enough to prepare three coupons for the testing specified in Paragraph 3.4.1.5. The Contractor shall provide two coupons to the Contracting Officer for laboratory testing and archive samples. The resulting hole shall be patched by the Geomembrane Installer with an oval-shaped piece of sheet material at least 12 inches larger in all directions than the cut-out and seamed in accordance with the manufacturer's directions.

3.4.1.4 Any destructive samples or seams unable to be fully tested by the testing laboratory due to insufficient overlap shall be reconstructed and retested at the Contractor's expense.

3.4.1.5 Bonded Seam Strength and Peel Testing: The Geomembrane Installer shall conduct seam strength testing (breaking factor, ppi width) on random specimens from each startup seam and cutout seam in accordance with ASTM D 3083 (as modified in Annex A of NSF 54). The Geomembrane Installer shall conduct peel testing in accordance with Method D413, Method A or D816, Method C, using a minimum of five 1-inch (25.4 mm) wide specimens, a gage length of 1 inch (25.4 mm) (grips positioned 1/2 inch (13.0 mm) on either side of the start of seam bond) and a constant machine crosshead speed of 2 in/min. The seam overlap length shall be as fabricated in the field. The test specimen shall be fully supported within the grips across the width of the specimen. The field seams shall exhibit properties as specified in this SECTION 2.1.1.1.1 after a minimum 24 hour cure.

3.4.1.6 The geomembrane installer shall mark each seam with the following as a minimum: seamer, date time started and ended and seam number.

3.4.1.7 The Contractor must submit all Quality Control testing results to the Contracting Officer.

3.4.2 The Contracting Officer may employ and pay for an independent testing laboratory to perform additional testing.

3.4.3 Contractor shall:

3.4.3.1 Cooperate with laboratory personnel and provide access to Work.

3.4.3.2 Provide to laboratory representative samples of materials to be tested, in required quantities.

3.4.3.3 Furnish labor and facilities:

3.4.3.3.1 Provide access to Work to be tested.

3.4.3.3.2 Facilitate inspections and tests.

3.4.3.4 Notify laboratory and Contracting Officer sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

3.4.4 Refer to Paragraph 1.2.4 of this SECTION for additional requirements.

3.5 Repair of Damaged Geomembrane Sections

3.5.1 Any geomembrane surface, showing injury due to scuffing, penetration by foreign objects, factory defects, damage from rough subgrade or distress shall, as directed by the Contracting Officer, be replaced or covered and sealed with an additional layer of geomembrane material of suitable size to allow a minimum lapping of two inches from the injured surface by the Geomembrane Installer at no additional cost to

the Government. Sealing shall be done with the approved solvent method. The patch must extend a minimum of 12 inches in each direction. The edge of the patch should be rounded with no square corners. Solvent should be applied to form a bond as recommended by the manufacturer. The Contractor shall determine and correct the cause of damage to the geomembrane.

3.5.2 The Contractor shall smooth out any wrinkles in the geomembrane. Any wrinkles which cannot be smoothed out shall be cut, overlapped, and covered with a cover system strip, field installed and tested in accordance with the requirements of this SECTION by the Geomembrane Installer at no additional cost to the government.

3.5.3 The completed repair shall be non-destructively tested by the Contractor and marked with the date, seamer and results of non-destructive test. Necessary repairs caused by negligence of Contractor shall be at Contractor's expense. No soil materials shall be placed over the geomembrane prior to acceptance by the Contracting Officer. The Contracting Officer reserves the right to accept portions of the project prior to completion of the entire project. No vehicles shall be permitted on the geomembranes prior to placement of the soil cover to a depth of at least 12 inches.

3.5.4 Any damage evidenced by construction equipment during cover placement shall be exposed, repaired and non-destructively tested by the Geomembrane Installer at no cost to the government.

3.5.5 The Contractor shall place cover soil over the geomembrane to minimize the production of wrinkles in the geomembrane.

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SECTION 06450

PVC COMPOSITE GEOMEMBRANE

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish all labor, materials, equipment and incidentals required to supply, install, field seam and test a 40 mil polyvinyl chloride (PVC) composite geomembrane as shown on the Contract Drawings and specified herein.

1.1.2 The Contractor shall install 40-mil PVC composite geomembrane on all side slopes steeper than 8% (12.5 Horizontal: 1 Vertical). In all areas with slopes less than 8% the 40 mil PVC geomembrane shall be installed by the Contractor in accordance with SECTION 06400: PVC GEOMEMBRANE.

1.1.3 Related Sections.

1.1.3.1 SECTION 06300: GEOSYNTHETICS

1.1.3.2 SECTION 06400: PVC GEOMEMBRANE

1.1.3.3 SECTION 06500: COLD WEATHER INSTALLATION

1.2 Quality Assurance

1.2.1 The Contractor shall refer to SECTION 06400: PVC GEOMEMBRANE for quality assurance requirements.

1.3 Submittals

1.3.1 The Contractor shall refer to SECTION 06400: PVC GEOMEMBRANE for submittal requirements.

1.4 Warranty

1.4.1 The Contractor shall provide the PAFB with six copies of a warranty that the material supplied to produce the composite geomembrane rolls shall maintain its integrity for a period of 20 years provided that the covered landfill area is maintained by the PAFB and the material is covered with sufficient soil cover within 60 days to prevent deterioration.

1.5 Product Delivery, Storage and Handling

1.5.1 The Contractor shall refer to SECTION 06400: PVC GEOMEMBRANE for product delivery, storage and handling requirements.

2. PRODUCTS

2.1 PVC Composite Geomembrane Material

2.1.1 PVC composite geomembrane is a 40-mil PVC geomembrane laminated with a 6.0 oz. non-woven geotextile on each side. The geotextile is manufactured from recycled Polyethylene Terephthalate, (PET) and is bonded to the 40-mil PVC geomembrane using a co-polymerized vinyl adhesive.

2.1.2 The geotextile shall be fully bonded to the geomembrane to provide product integrity and yet readily removable (without the use of solvents) to facilitate field seaming and repairing as required.

2.1.3 The 40 mil PVC geomembrane shall have passed Bureau of Reclamation resistance to soil burial test formulated for resistance to microbiological attack. The geomembrane material shall be neutral gray to black in color and produced in a standard minimum sheet width of not less than 60 inches. Widths of the geomembrane material shall be fabricated together by means of factory-bonded seams using either dielectric heat or solvent bonding. All seams shall be lapped, using the manufacturers recommended minimum seam width.

2.1.4 Properties of the 40-mil PVC geomembrane are detailed in SECTION 06400: PVC GEOMEMBRANE.

2.1.5 Properties of the PET geotextile are detailed in SECTION 06300: GEOSYNTHETICS.

2.2 Pipe Penetration Materials

2.2.1 For pipe penetration materials refer to SECTION 06400: PVC GEOMEMBRANE.

3. EXECUTION

3.1 The Contractor shall prepare for PVC Composite Geomembrane Installation as follows:

3.1.1 Refer to SECTION 06400: PVC GEOMEMBRANE for subgrade preparation procedures as specified for the 40-mil PVC Geomembrane installation.

3.2 Installation of PVC Composite Geomembrane:

3.2.1 The Contractor shall provide the items and follow the installation procedures for the geomembrane described in SECTION 06400: PVC GEOMEMBRANE, including:

3.2.1.1 The PVC composite geomembrane shall be supplied in rolls.

3.2.1.2 The Contractor shall use methods unrolling that do not cause scratches, folds, crimps, in the composite geomembrane and does not cause damage to the subgrade. The Contractor shall not use excessive force to pull composite geomembrane into place.

3.2.1.3 The Contractor shall use methods to deploy the composite geomembrane that do not allow materials to "free fall" or roll unrestrained down slopes.

3.3 Field Quality Control During Installation

3.3.1 For field quality control during installation refer to SECTION 06400: PVC GEOMEMBRANE.

3.4 Repair of Damaged PVC Composite Geomembrane Sections

3.4.1 Any composite geomembrane surface, existing or new, showing injury due to scuffing, penetration by foreign objects, factory defects, damage from rough subgrade or distress shall, as directed by the Contracting Officer, be replaced or covered and sealed with an additional layer of geomembrane material of suitable size to allow a minimum lapping of two inches from the injured surface by the Composite Geomembrane Installer at no additional cost to the Government. Sealing shall be done with the approved solvent method. The cause of damage to the composite geomembrane shall be determined and corrected by the Contractor.

3.4.2 The Contractor shall smooth out any wrinkles in the geomembrane. Any wrinkles which cannot be smoothed out shall be cut, overlapped, and covered with a cover system strip, field installed and tested in accordance with the requirements of SECTION 06400: PVC GEOMEMBRANE and this SECTION by the Geomembrane Installer at no additional cost to the government. Specifically for the PVC composite geomembrane, the Contractor shall strip the geotextile away from the geomembrane using a hot air gun if necessary, exposing the 40 mil PVC geomembrane to be repaired. Patch material for the 40 mil PVC geomembrane shall be the same as the parent material with geotextile bonded to one side only to ensure fabric continuity. Patches shall have rounded corners and extend a minimum of 6 inches beyond the edge of the defect. The entire patch shall be chemically fused as recommended by the manufacturer and approved by the Contracting Officer.

3.4.3 The completed repair shall be non-destructively tested and marked by the Geomembrane Installer with date, seamer and results of non-destructive test. Necessary repairs caused by negligence of Contractor shall be at Contractor's expense. No soil materials shall be placed over the geomembrane prior to acceptance by the Contracting Officer. No vehicles shall be permitted on the geomembranes prior to placement of the soil cover to a depth of at least 12 inches.

3.4.4 Any damage evidenced by construction equipment during the Contractor's cover construction activities shall be exposed, repaired and non-destructively tested by the Contractor at no cost to the government.

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SECTION 06500

COLD WEATHER INSTALLATION - GEOMEMBRANE

1. GENERAL

1.1 Scope:

1.1.1 The Work covered by this section consists of cold weather installation requirements and supplements SECTIONS 06400: PVC GEOMEMBRANE and 06450: PVC COMPOSITE GEOMEMBRANE. The Contractor may be required to work through cold weather months. If cold weather conditions prevail, the Contractor shall adjust the storage, handling, and installation procedures and conduct all necessary Work to ensure the integrity of the installed geomembranes and cover system materials. All of the provisions of SECTIONS 06400: PVC GEOMEMBRANE and 06450: PVC COMPOSITE GEOMEMBRANE will be strictly adhered to, except as modified herein.

1.1.2 All necessary Work required for snow and ice removal is included herein.

1.1.3 No direct or separate payment will be made for cold weather storage and installation of geomembranes, snow or ice removal and for providing all other labor, materials, tools, equipment and services necessary to meet the requirements specified in this SECTION.

1.2 Related Sections:

1.2.1 SECTION 02225: EXCAVATION AND BACKFILL.

1.2.2 SECTION 02226: FINAL COVER CONSTRUCTION.

1.2.3 SECTION 06300: GEOSYNTHETICS.

1.2.4 SECTION 06400: PVC GEOMEMBRANE.

1.2.5 SECTION 06450: PVC COMPOSITE GEOMEMBRANE.

1.3 Submittals

1.3.1 The Contractor may be required to work through cold weather months. Therefore, the proposed methods of cold weather installation construction shall be submitted in sufficient detail for the Contracting Officer to evaluate the proposed cold weather methods and techniques, such as preheating materials, the use of portable, heated enclosure shacks for field seaming, and other special equipment.

1.3.2 The Contractor shall pre-submit acceptable evidence (to be approved by the Contracting Officer) that his performance standards will be maintained at lower temperatures.

1.3.3 Submittals for Cold Weather Installation:

1.3.3.1 Seaming shall be suspended when ambient temperatures are below 41°F. At his option, the Contractor may submit a cold weather installation plan for the review and approval of the Contracting Officer.

1.3.3.2 The Contractor may submit to the Contracting Officer the following additional cold weather construction items and information for approval, not later than 5 days after the notice to proceed:

1.3.3.2.1 Field seaming and fabrication details during cold weather when temperatures are below 41°F.

1.3.3.2.2 Work plan for geomembrane installation during cold weather including manpower and equipment requirements.

1.3.3.2.3 Shop Drawings and installation diagrams for geomembrane panel sections layout and penetration details.

1.3.3.3 The Contractor shall also specify any additional proposed method of testing the field seams. This testing is to be performed by the Geomembrane Installer who will be required to provide a written report in accordance with SECTIONS 06400: PVC GEOMEMBRANE and 06450: PVC COMPOSITE GEOMEMBRANE.

1.3.3.4 The Contractor shall present a schedule of cold weather operations to the Contracting Officer and obtain the Contracting Officer's approval in writing of the same. This schedule shall be submitted sufficiently in advance of the proposed work as to afford a reasonable amount of time for the Contracting Officer to review and approve the schedule.

1.3.3.5 The Contractor shall not install geomembrane at ambient temperatures less than 41°F without an approved cold weather installation plan.

1.3.3.6 The Contractor shall provide the Contracting Officer with the results of cold crack tests prior to installation or seaming of geomembrane at ambient temperatures less than 41°F.

2. PRODUCTS

(Refer to SECTIONS 06400: PVC GEOMEMBRANE and 06450: PVC COMPOSITE GEOMEMBRANE)

3. EXECUTION

3.1 Cold Weather Storage of Geomembrane Materials

3.1.1 Contractor shall store and protect materials in accordance with manufacturer's recommendations and requirements of the Specifications. The Contractor shall make his own provisions for heated storage, if required by the geomembrane manufacturer.

3.2 Geomembrane Subgrade

3.2.1 The Contractor shall not place geomembrane over water, ice, snow or frozen precipitation of any kind. Geomembrane shall not be placed over frozen subgrade which in the opinion of the Contracting Officer may be detrimental to the integrity of the geomembrane installation. Unacceptable subgrade shall be reworked and replaced as necessary by the Contractor to provide adequate geomembrane support.

3.3 Cold Weather Installation Requirements for PVC Geomembranes

3.3.1 The Contractor shall be required to implement the previously approved cold weather installation methods when the air temperature reaches 41°F or below. As a minimum the cold weather construction methods to be implemented shall include:

3.3.1.1 Providing additional labor, seaming crews, materials and equipment as required to pursue the work.

3.3.1.2 A minimum of one cold crack test (ASTM D 1790) per panel or per 10,000 sq. ft., whichever is less, prior to installation or seaming.

3.3.1.2.1 The Contractor shall provide the Contracting Officer with all cold crack information prior to placement or seaming of the PVC geomembrane.

3.3.1.3 No geomembrane panel seaming and placement activities below an ambient air temperature of 25° Fahrenheit.

3.3.1.4 Exercising extra care in preparing panel edges prior to seaming to insure that edges to be seamed are dry, clean and free of all dirt, snow, ice, slush or water.

3.3.1.5 Seaming within heated, portable, protective shelters while maintaining a geomembrane temperature within the shelter greater than 41°F.

3.3.2 If wind, cold humidity, or blowing snow conditions prevail, the Contractor shall conduct field seaming in heated, portable shelters to minimize geomembrane heat loss and to maintain dry, clean panel edges during seaming.

3.3.3 In addition to the quality assurance sampling and testing specified in SECTIONS 06400: PVC GEOMEMBRANE and 06450: PVC COMPOSITE

GEOMEMBRANE, the Contractor shall provide and operate a portable pull test machine at the site during field seaming operations. The Contractor shall sample the geomembrane seam and conduct pull tests during the seaming to insure that acceptable weld seams are being fabricated and to gauge the effectiveness of the cold weather construction methods. Contractor shall sample and perform pull tests a minimum of 4 times per shift and as ordered by the Contracting Officer. Contractor shall adjust the seaming and construction methods to achieve acceptable field seams.

3.3.4 Contractor shall place select fill drainage layers over geomembrane, as required by SECTION 02226: FINAL COVER CONSTRUCTION, as soon as field seams have cured, been tested and accepted.

3.3.5 Contractor shall consider protection of employees and comply with all State and Federal Health and Safety requirements.

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SECTION 06600

POLYETHYLENE PIPE

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish all labor, tools, materials, equipment and incidentals required to provide high density polyethylene pipe for the installation of gas vents, cover system toe drain, gas monitoring wells and appurtenances as shown, and specified.

1.1.2 It is the intention of the Contract Drawings and of these Specifications to provide complete and workable piping systems and any miscellaneous fittings required for proper completion of the Work.

1.1.3 Piping shall be of the sizes and extent shown on the Contract Drawings or indicated in these Specifications.

1.1.4 All jointing materials and other miscellaneous appurtenances and accessories shall be provided.

1.2 Coordination: Review requirements and procedures under other sections and coordinate with the Work which is related to this SECTION.

1.3 Related Sections:

1.3.1 SECTION 02225: EXCAVATION AND BACKFILL.

1.3.2 SECTION 02226: FINAL COVER CONSTRUCTION.

1.3.3 SECTION 15351: GAS VENT INSTALLATION.

1.3.4 SECTION 15361: GAS MONITORING WELL INSTALLATION

1.4 Quality Assurance

1.4.1 Manufacturer Qualifications: The piping specified herein shall be provided by a manufacturer who has thoroughly familiarized himself with the design intent of the overall system and will provide piping suitable for the service intended.

1.4.2 Piping shall be obtained from no more than one manufacturer.

1.4.3 Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1.4.3.1 ASTM F 714-85, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.4.3.2 ASTM D 1248-84, Polyethylene Plastics Molding and Extrusion Materials.

1.4.3.3 ASTM D 3035, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

1.4.3.4 ASTM D 3261, Butt Heat Fusion Polyethylene (PE) Plastic Fitting for Polyethylene (PE) Plastic Pipe and Tubing.

1.4.4 Inspection. The quality of all materials, process of manufacture and the finished pipe, fittings and specials shall be subject to the inspection and approval of the Contracting Officer.

1.5 Submittals

1.5.1 Shop Drawings: Submit for approval detailed drawings and data on pipe, fittings, and appurtenances.

1.5.2 Certificates: Submit certificates of compliance with referenced standards.

1.6 Product Delivery, Storage and Handling

1.6.1 Handle all pipe, fittings, and accessories carefully with approved handling devices. Do not drop or roll pipe off trucks. Do not otherwise drop, roll or skid pipe. Materials cracked, gouged, chipped dented or otherwise damaged will not be approved and shall be removed and replaced at Contractor's expense.

1.6.2 Store pipe, fittings and accessories on heavy wood blocking or platforms so they are not in contact with the ground.

2. PRODUCTS

2.1 General:

2.1.1 The PE piping system shall be made from polyethylene resin compound qualified as Type III, Category 5, Class C, Grade P34 in ASTM D 1248-84.

2.1.2 The raw material shall contain a minimum of 2% carbon black, well dispersed. Additives which can be conclusively proven not to be detrimental to the pipe may also be used, provided the pipe produced meets the requirement of this standard.

2.1.3 The piping system shall contain no recycled compound except that generated in the manufacturer's own plan from resin of the same specification from the same raw material supplier.

2.1.4 Size and Extent: Nominal 4 and 6 inch pipe size and as shown on the Contract Drawings.

2.2 Piping Systems

2.2.1 Rigid Gas Venting Risers/Gas Monitoring Well (Solid and Perforated):

2.2.1.1 Pipe: SDR26, conforming to ASTM F 714-85.

2.2.1.2 Joints: Thermal butt-fusion, conforming to ASTM D 2567, or buttress locked (threaded).

2.2.1.3 Perforations: 1/4 diameter holes on staggered 6-inch centers drilled 45 degrees below the horizontals as shown on the Contract Drawings.

2.2.2 Perforated Corrugated Gas Venting Laterals/Cover System Toe Drain:

2.2.2.1 Pipe (Tube): Conforming to AASHTO M252.

2.2.2.2 Size and Extent: Nominal 6 inch pipe (tube) size and as shown on the Contract Drawings.

2.3 Identification

2.3.1 All pipe materials shall be stamped, marked or identified with the following:

2.3.1.1 Name of manufacturer.
2.3.1.2 Date of manufacture.
2.3.1.3 Nominal pipe size.
2.3.1.4 Dimension ratio.
2.3.1.5 The letters PE followed by the polyethylene grade per ASTM D 1248, followed by the Hydrostatic Design basis in 100's of psi, e.g. PE 3408.
2.3.1.6 Manufacturing Standard Reference, e.g. ASTM F 714-85.

2.4 Other Products

2.4.1 Pipe Penetration Materials

2.4.2 Factory fabricated and installed as detailed in SECTION 06400: PVC GEOMEMBRANE and SECTION 06450: PVC COMPOSITE GEOMEMBRANE, and as shown on the Contract Drawings.

3. EXECUTION

3.1 Inspection

3.1.1 Inspect all materials to ensure proper operation and absence of defects. The compatibility of all pipe, fittings, couplings, and appurtenances shall be verified.

3.2 Preparation

3.2.1 Excavation required for gas venting and monitoring well piping shall conform to the requirements of SECTION 02225: EXCAVATION and BACKFILL, SECTION 15351: GAS VENT INSTALLATION and SECTION 15361: GAS MONITORING WELL INSTALLATION.

3.3 Installation

3.3.1 All piping and appurtenances shall be installed in accordance with the manufacturer's instructions.

3.3.2 If any piping must be cut, the work shall be done in a satisfactory manner so as to avoid damage to the pipe and to leave a smooth end.

3.3.3 All pipe and appurtenances shall be laid or placed to the lines and grades shown. All joints shall be made up in the presence of Contracting Officer.

3.3.4 Piping (Tubing) for the cover system toe drain shall be installed as specified in SECTION 02226: FINAL COVER CONSTRUCTION and as shown on the Contract Drawings.

3.3.5 Piping for the gas venting shall be installed as specified in SECTION 15351: GAS VENT INSTALLATION.

3.3.6 Piping for the gas monitoring wells shall be as specified in SECTION 15361: GAS MONITORING WELL INSTALLATION.

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SPECIFICATIONS FOR
PLATTSBURGH AIR FORCE BASE LANDFILL NO. 23

INDEX
Division No. 15
MECHANICAL

SECTION 15351

GAS VENT INSTALLATION

1. GENERAL

1.1 Scope:

1.1.1 Contractor shall furnish all equipment, materials and incidentals necessary for the drilling, excavation, and installation of the gas vents. The Work includes all buried and exposed piping, fittings, specials, appurtenances, and cleaning as shown and specified. The Work includes, but is not limited to, the following:

1.1.1.1 Buried and exposed piping.

1.1.1.2 Cleaning.

1.1.1.3 Testing.

1.1.1.4 Also included are installation of all joints, specials, couplings, adapters, tie rods, jointing and gasketing materials, closures, end cover systems, and all other work required to complete the piping installation.

1.1.2 Related SECTIONS:

1.1.2.1 SECTION 01460: HEALTH AND SAFETY REQUIREMENTS.

1.1.2.2 SECTION 02225: EXCAVATION AND BACKFILL.

1.1.2.3 SECTION 02226: FINAL COVER CONSTRUCTION.

1.1.2.4 SECTION 02277: CRUSHED ROCK.

1.1.2.5 SECTION 06300: GEOSYNTHETICS.

1.1.2.6 SECTION 06400: PVC GEOMEMBRANE.

1.1.2.7 SECTION 06450: PVC COMPOSITE GEOMEMBRANE.

1.1.2.8 SECTION 06600: POLYETHYLENE PIPE.

1.2 General Requirements

1.2.1 The approximate locations of gas vents are shown on the Contract Drawings. The Contractor shall be responsible for accurately identifying

the planned and the completed gas vent locations by employing a licensed surveyor.

1.2.2 The Contractor's health and safety plan shall describe how the Contractor shall protect Contractor's employees, Contracting Officer, and others from health hazards associated with installing the gas vents. Refer to SECTION 01460: HEALTH AND SAFETY REQUIREMENTS.

1.3 Required Tests (where applicable)

1.3.1 ASTM D2922, Density of Soil and Soil Aggregate and Rock in Place by Nuclear Methods (Shallow Depth).

1.3.1.1 The in-place density of the gas vent fill will be tested at least once per location or at the direction of the Contracting Officer.

1.4 Submittals

1.4.1 Shop Drawings: Submit for approval the following:

1.4.1.1 Laying schedules and detailed layout drawings for all piping. The layout drawings shall be prepared to scale with reference to stationing and elevations shown on the Contract Drawings. Each piece of pipe, fitting or special shall be designated on the layout drawings.

1.4.1.2 Full details of piping and connections.

1.4.3 Certificates: Submit certificates of compliance with referenced standards.

1.4.4 Record Drawings: During progress of the Work, keep an up-to-date set of drawings showing field and Shop Drawing modifications and revisions. Immediately upon completion of piping work, submit mylar tracings showing the actual in-place installation of all piping and equipment installed under this SECTION, at a scale satisfactory to the Contracting Officer. The drawings shall show all piping in plan and in sections, with all reference dimensions and elevations required for complete record drawings of the piping systems. Two paper prints shall also be furnished. The tracings shall be furnished not later than 30 days after completion of the Contract.

2. PRODUCTS

2.1 Gas Vent Marking:

2.1.1 Each gas vent shall be clearly marked with the gas vent designation as identified on the Contract Drawings. Method of marking shall be coordinated with Contracting Officer.

2.2 Materials:

2.2.1 Piping:

2.2.1.1 Solid and perforated piping, appurtenances, couplings, fittings, etc. shall be provided and installed as specified in SECTION 06600: POLYETHYLENE PIPE.

2.2.2 Gas Vent Fill:

2.2.2.1 Gas vent fill material shall be provided and placed as specified for Product in SECTION 02277: CRUSHED ROCK.

2.2.3 PVC Geomembrane:

2.2.3.1 Geomembrane shall be provided and installed as specified in SECTION: 06400 PVC GEOMEMBRANE.

2.2.4 Composite Geomembrane:

2.2.4.1 Geomembrane shall be provided and installed as specified in SECTION 06450: PVC COMPOSITE GEOMEMBRANE.

3. EXECUTION

3.1 Installation

3.1.1 Install piping, gas vent fill, and PVC Geomembrane as shown, specified and as recommended by the manufacturer and in conformance with referenced standards and approved Shop Drawings.

3.1.2 Piping that is cracked, damaged, crushed, gouged or in poor condition will be rejected.

3.1.3 Contractor shall be responsible for physically siting the locations of all gas vents by employing a surveyor to determine tie down distance and bearings relative to physical features shown on the Contract Drawings. Contractor shall also determine the location and top of vent elevation for each gas vent after the gas vents are completed.

3.1.4 Contractor shall furnish all vehicles, equipment, supplies, and materials to and from the job site.

3.1.5 If the Contractor utilizes drilling techniques to construct the gas vents, drillers shall be advised that drilling operations for the gas vents will be conducted through domestic waste. Types of material that will be encountered, at a minimum, may include earth, sand, rubbish, trash, garbage, large appliances, furniture and other materials.

3.1.6 The Contractor shall initiate a site specific Health and Safety Plan to protect employees, Contracting Officer and authorized site visitors.

3.2 Gas Vent Fill:

3.2.1 Gas vent fill material to be placed around the gas vent perforated piping as described herein shall be furnished, placed and compacted by Contractor. All gas vent fill material used for gas venting fill purposes shall be of acceptable quality and as described in this SECTION.

3.2.2 Place the gas vent fill material as promptly as Work permits, but not until completion of the following:

3.2.2.1 Acceptance by Contracting Officer of construction below finish grade.

3.2.2.2 Removal of trash and debris.

3.2.3 The gas vent fill material shall be kept dry during placement and compaction operations.

3.2.4 Unless otherwise specified or directed by Contracting Officer, the gas vent fill material shall be placed in horizontal loose lifts of up to 18 inches in thickness after placing.

3.2.5 No gas vent fill material shall be placed when free water is standing on the surface of the area where the gas vent fill material is to be placed. No compaction of gas vent fill material will be permitted with free water on any portion of the gas venting layer to be compacted.

3.2.6 No gas vent fill material shall be placed in a frozen condition or on top of frozen material. Frozen material shall be removed prior to continuing with the Work. Gas vent fill material containing organic materials or other unacceptable material shall be removed and replaced with approved material at no additional cost to the government.

3.2.7 The density to be obtained in compacting the gas vent fill shall be 90 percent of the Maximum Index Density obtained in the laboratory in accordance with ASTM D4253.

3.3 Gas Vents:

3.3.1 The Contractor shall furnish, construct, and install the 6 inch solid and perforated polyethylene pipe as shown on the Contract Drawings. Piping shall be perforated as shown on the Contract Drawings. The bottom and ends of each pipe is to be capped with a polyethylene cover system fused to the pipe.

3.3.2 All pipe ends are to be deburred prior to bonding.

3.3.3 If drilling is utilized, drilling shall be performed by auger or other approved methods. The depth of the finished vent will be verified, in the field, by the Contracting Officer to the nearest foot. In the event the auger will not penetrate, the Contracting Officer may request the Contractor to abandon the hole and redrill at a new location as indicated by the Contracting Officer at no expense to the government. All excavated material shall be cleared from the location and moved to a location designated by the Contracting Officer. Domestic waste shall be disposed in accordance with SECTION 02225: EXCAVATION AND BACKFILL.

3.3.4 Contractor shall construct the gas vents at the locations and depths shown on the Contract Drawings. If a conflict exists, obtain clarification from the Contracting Officer prior to proceeding.

3.3.5 The Contractor shall flush the pipe to remove any debris that may have collected inside the pipe prior to installation.

3.3.6 The Contractor shall install vertical pipe truly plumb in all directions.

3.3.7 The gas vent fill will be installed around the perforated piping. Take care to avoid bridging and overfilling or damage to the polyethylene piping.

3.3.8 No foreign materials (i.e., drill cuttings, garbage, solid waste, etc.) shall be permitted to fill the space next to the perforated pipe or riser. In the event the bore hole collapses during installation of the vent, the Contractor will take measures necessary to correct this situation at no expense to government. All procedures shall be to the satisfaction of the Contracting Officer.

3.3.9 The Contractor shall install the lateral pipes and gas vent fill as shown on the Contract Drawings; followed by installation of the riser and gooseneck.

3.4 Jointing Pipe

3.4.1 Polyethylene Butt Fusion Welded Joints: All polyethylene piping shall be butt fusion welded per ASTM D 2567, or comparable manufacturer process.

3.4.1.1 Qualification of welders and butt fusion operators:

3.4.1.1.1 No welder or welding operator who has not been fully qualified and is not certified by the local chapter of NCPWB or similarly locally qualified shall be employed on the Work.

3.4.1.1.2 No butt fusion operator for the joining of polyethylene pipe who has not been fully qualified and fully trained by the butt fusion equipment manufacturer or polyethylene pipe manufacturer shall be employed on the Work.

3.5 Cleaning

3.5.1 Contractor shall remove all debris, dirt and waste materials resulting from the installation.

3.5.2 All drill cuttings and other debris shall be disposed of in accordance with SECTION 02225: EXCAVATION AND BACKFILL.

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SECTION 15361

GAS MONITORING WELL INSTALLATION

1. GENERAL

1.1 Scope:

1.1.1 CONTRACTOR shall furnish all equipment, materials and incidentals necessary for the drilling and installation of the proposed gas monitoring wells in the locations shown on the Contract Drawings.

1.2 Related Sections:

1.2.1 SECTION 02225: EXCAVATION AND BACKFILL.

1.2.2 SECTION 02277: CRUSHED ROCK.

1.2.3 SECTION 06600: POLYETHYLENE PIPE.

1.3 Submittals.

1.3.1 Shop drawings shall be submitted in accordance with SECTION 01341: SHOP DRAWING PROCEDURES. Drawings shall show all necessary details required to construct the gas monitoring wells.

1.4 General Requirements:

1.4.1 The location of the gas wells shall be as shown on the Contract Drawings. Since unsuccessful attempts at drilling may occur, the location of the wells may vary.

1.4.2 The Contractor shall be responsible for accurately identifying the planned and the completed well locations by employing a licensed surveyor.

2. PRODUCTS

2.1 Pipe materials shall be as shown on the Contract Drawings and in SECTION 06600: POLYETHYLENE PIPE.

2.2 Pipe Marking: Each well shall be clearly marked with a designation which shall conform with designations shown on the shop drawings.

2.3 Gravel Pack: The gravel shall consist of well graded, clean screened gravel or crushed stone obtained from the approved source and in accordance with SECTION 02277: CRUSHED ROCK.

2.4 Seal Above Gravel Pack: The seal to be used above the gravel pack in the gas monitoring well shall be granular bentonite mixed with soil. The soil-bentonite mixture permeability shall not be greater than 1×10^{-7} cm/sc when in place. The thickness of the application shall be as shown on the Contract Drawings; however, the actual thickness shall depend upon the field conditions encountered and shall be subject to the Contracting Officers's approval.

3. EXECUTION

3.1 General:

3.1.1 Contractor shall install piping as shown, specified and as recommended by the manufacturer.

3.1.2 Piping that is cracked, damaged, crushed, gauged or in poor condition shall be rejected.

3.1.3 Contractor shall be responsible for physically siting the exact locations of all gas wells by employing a licensed surveyor to determine tie down distance and bearings relative to physical features shown on the Contract Drawings. Contractor shall also determine the location and top of well elevation for each gas well after the gas wells are completed.

3.1.4 Contractor shall furnish all vehicles, equipment, supplies, and materials to and from the job site.

3.2 Gas Monitoring Wells:

3.2.1 Contractor shall drill and install gas wells at the locations shown on the Contract Drawings. If a conflict exists, the Contractor shall obtain clarification from the Contracting Officer before proceeding.

3.2.2 The Contractor shall install the gas wells to a maximum depth of twenty five (25) feet below the ground surface. If the ground water table is encountered before reaching 25 feet below the ground surface, the well shall be installed to a depth of three (3) feet above the elevation of the ground water encountered in that particular hole.

3.2.3 The Contractor shall furnish, slot, and install the 4-inch SDR-26 HDPE pipe as shown on the Contract Drawings. Each well pipe shall be slotted as shown on Contract Drawings. Each well pipe shall have two 1/2 inch diameter drain holes located 8 inches from the bottom of each pipe, 180 degrees apart. The bottom of each pipe shall be capped with a 4-inch SDR-26 HDPE cap bonded to the pipe.

3.2.4 All slotting operations shall be performed prior to delivery of pipe to the job site.

3.2.5 All pipe ends shall be deburred prior to bonding.

3.2.6 Drilling shall be performed by auger. The depth of the finished well will be verified, in the field, by the Contracting Officer to the nearest foot. In the event the auger will not penetrate, the Contracting Officer may request the Contractor to abandon the hole and redrill at a new drilling location as indicated by the Contracting Officer. All excavated material shall be cleared from the location and moved to a location designated by the Contracting Officer. Excavated materials shall be used as backfill in accordance with the requirements for using on-site material as backfill as detailed in SECTION 02225: EXCAVATION AND BACKFILL.

3.2.7 The Contractor shall flush the pipe to remove any debris that may have collected inside the pipe prior to installation.

3.2.8 The 4-inch slotted HDPE pipe shall be installed by centering it within the hole.

3.2.9 The gravel pack shall be installed around the slotted pipe. The Contractor shall avoid bridging and overfilling or damaging the HDPE pipe.

3.2.10 No material removed during drilling operation (i.e., drill cuttings) shall be permitted to fill the space next to the slotted pipe or riser. In the event the bore hole wall collapses during installation of the well, the Contractor shall take measures necessary to correct this situation at no expense to the government. All procedures shall be done to the satisfaction of the Contracting Officer.

3.2.11 The Contractor shall install a bentonite seal as shown on the Contract Drawings.

3.3 Cleaning:

3.3.1 The Contractor shall remove and dispose of all debris, including drill cuttings and waste materials resulting from installation as specified in SECTION 02225 EXCAVATION AND BACKFILL.

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